2015 Adrian Tinsley Program
*Summer Research Symposium*

**Wednesday, August 5, 2015**

8:00 am – 4:30 pm

Moakley Center

Bridgewater State University

**SYMPOSIUM PROGRAM**

All presentations will take place in the Moakley Auditorium and Atrium.

*Individual oral presentation will be 12 minutes; group project oral presentations will be 17 minutes.*

A 3-minute Q & A will follow each talk.

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<th>Time</th>
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<tr>
<td>8:00 - 8:30 am</td>
<td>Continental breakfast in Moakley Atrium; Poster and display setup</td>
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<tr>
<td>8:30- 9:00 am</td>
<td>Opening Remarks: Provost, Dr. Barbara Feldman</td>
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<td></td>
<td>Mentor Recognition: ATP Co-Coordinators, Dr. Jenn Manak &amp; Dr. Shannon</td>
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<td>Lockard</td>
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<tr>
<td>9:00- 10:05 am</td>
<td>Oral Session I: Moakley Auditorium</td>
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<td></td>
<td><em>Presenters: T. Stevens, A. Amaral, S. Peck, G. Desmarais &amp; M. Hawes</em></td>
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<tr>
<td>10:05 – 11:00 am</td>
<td>Poster Session I: Moakley Atrium (refreshments provided)</td>
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<td>*Presenters: N. Akin, K. Arnold, M. Bennett, N. Bryden, B. Daudelin, M.</td>
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<td>Habboub, C. Joyce, T. Kelleher, A. Leonard, K. Merrill, G. Ortiz, R.</td>
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<td>Precopio, E. Zankeria, A. Zikos</td>
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<td>11:00 – 12:00 pm</td>
<td>Oral Session II: Moakley Auditorium</td>
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<td><em>Presenters: N. Pasciuto, J. Hicks, C. McDonald, J. Covert</em></td>
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<tr>
<td>12:00 – 12:30 pm</td>
<td>Lunch in Burnell Atrium</td>
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<td>12:45 – 1:50 pm</td>
<td>Oral Session III: Moakley Auditorium</td>
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<td><em>Presenters: E. Wiegand, S. Sawyer, B. Carley, K. Bouley &amp; N. Hathaway</em></td>
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<td>1:50– 2:45 pm</td>
<td>Poster Session II: Moakley Atrium</td>
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<td>*Presenters: J. Ballarino, D. Cardoza, A. Forte, K. Greeley, J.Hooper, S.</td>
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<td>Johnson, S. Kletsov, P. Kurriss, D. Lewis, B. Mash, M. Mattos, S.</td>
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<td>Oikarinen, B. Pacheco, K. Roebuck, E. Slate, L. Sprague, F. Stoltz, F.</td>
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<td>Vasconcelos</td>
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<td>2:45 – 4:00 pm</td>
<td>Oral Session IV: Moakley Auditorium</td>
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<td><em>Presenters: B. Cataldo, W. Tringali, C. Bradley, M. Doyon, A. Roberts</em></td>
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<td>4:00 – 4:30 pm</td>
<td>Ice Cream Social, Moakley Atrium</td>
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ORAL PRESENTATION SESSION I

(9:00 am - 10:05 am)

9:00 am  Tamara Stevens, Mentor: Dr. Emily Field (English)
Rising up through the Rhythm of the Soul: African American Artists’ Response to Police Violence in Poetry and Song

9:15 am  Alyssa Amaral, Mentor: Dr. Emily Field (English)
Moving Past Race?: Contemporary African American Authors' Revisions of 19th-Century Race Conversations

9:30 am  Sarah Peck, Mentor: Dr. Brian Payne (History)
The Biological and Cultural Ramifications of Animal Husbandry and European Vermin in the New World: A Focus on New England

9:45 am  Gabby Desmarais & Melanie Hawes, Mentor: Dr. Brian Payne (History)
Examining the Ethnic Tensions in the Arctic

POSTER SESSION I: MOAKLEY CENTER ATRIUM

(10:05 am - 11:00 am)

- **Poster #1** – Nicole Akin, Mentors: Drs. Jennifer Manak & Ryan LaBrozzi (Elementary Education)
  Your Story, Your History: Social Studies and History Instruction in a Nicaraguan Primary School

- **Poster #3** – Kristen Arnold, Mentors: Drs. Jennifer Manak & Ryan LaBrozzi (Elementary Education)
  Literacy Teaching and Learning in a Nicaraguan Primary School

- **Poster #5** – Molly Bennett, Mentor: Dr. Patty Emmons (Elementary Education)
  Making Learning hAPPen: Exploring the Benefits of Using iPads to Enhance the Learning of Geometry in an Eighth-Grade Classroom

- **Poster #7** – Nicholas Bryden, Mentor: Dr. Thaya Paramanathan (Physics)
  Quantifying Binding of Binuclear Ruthenium Complex (λλ-P) to DNA Using Optical Tweezers

- **Poster #9** – Brian Daudelin, Mentor: Dr. Thaya Paramanathan (Physics)
  Advanced Optical Tweezers for Undergraduate Biophysical Research

- **Poster #11** – Melissa Habboub, Mentor: Dr. Edward Carter (Special Education)
  Understanding Factors that Impact the Use of Economical iPad Applications to Advance Communications Skills for Students with Autism Spectrum Disorders

- **Poster #13** – Arianna Zikos, Mentor: Dr. Vignon Oussa (Mathematics)
  A Canonical Classification of Coordinate Systems Arising from Linear Transformations

- **Poster #15** – Catherine Joyce, Mentor: Dr. Melissa Brandon (Psychology)
  Can the Addition of an Auditory Stimulus Increase a Participant’s Accuracy to Visually Predict a Prescribed Pattern?

- **Poster #17** – Terrence Kelleher, Mentor: Dr. Shannon Lockard (Mathematics)
  Exploring the Linear Independence of Matrix Represented Dihedral Groups when Multiplied by a Vector

- **Poster #19** - Andrew Leonard, Mentor: Dr. Sandra Neargarder (Psychology)
  The Relationship between Circadian Dysfunction and Cognitive Impairment in Individuals with Parkinson’s Disease

- **Poster #21** – Kristen Merrill, Mentor: Dr. Jennifer Manak (Elementary Education)
  Exploring the First Encounters from Multiple Perspectives through Critical Literacy Discussions in a Fifth-Grade Classroom

- **Poster #23** – Guillermo Ortiz, Mentor: Dr. Irina Seceleanu (Mathematics)
  Modeling the Consequences of Reduced Vaccination Coverage on the Spread of Measles

- **Poster #25** – Renee Precopio, Mentor: Dr. Laura Ramsey (Psychology)
  Dude Looks Like a Feminist! Morality and Feminism Among Men

- **Poster #27** – Emanuel Zanzerkia, Mentor: Dr. Kevin Rion (Mathematics)
  A Critical Analysis of Random Response Techniques
ORAL PRESENTATION SESSION II  
(11:00 am – 12:00 pm)

11:00 am  Nicholas Pasciuto, Mentor: Dr. Ward Heilman (Mathematics)
*The Mystery of Non-transitive Grime Dice*

11:15 am  Jasmin Hicks, Mentor: Dr. Joseph Seggio (Biological Sciences)
*The Physiological and Behavioral Effects of Wheel Running on High Fat Diet in C57BL/6J Mice*

11:30 am  Christopher McDonald, Mentor: Dr. Vignon Oussa (Mathematics)
*Classification of Wavelet Sets on the Real Line*

11:45 am  Jason Covert, Mentor: Dr. Robert Hellström (Geography)
*Impact of the El Niño-Southern Oscillation on Atmospheric Conditions within Tropical Pro-Glacial Valleys*

LUNCH - BURNELL ATRIUM  
(12:00 – 12:30 pm)

ORAL PRESENTATION SESSION III  
(12:45 pm – 1:50 pm)

12:45 pm  Emily Wiegand, Mentor: Dr. Allyson Ferrante (English)
*Unearthing Herstory: Women’s Participation in Creating Jamaica’s National Identity*

1:00 pm  Samantha Sawyer, Mentor: Dr. Christopher Bloch (Biological Sciences)
*Effects of Decomposition of Carrion on Surrounding Arthropod Populations and Soil Nutrient Content*

1:15 pm  Brad Carley, Mentor: Dr. Kenneth Adams (Biological Sciences)
*Examining Post-Translational Modifications of Egr-1 for Prevention of Proteasomal Degradation*

1:30 pm  Kourtnie Bouley & Nicholas Hathaway, Mentor: Dr. Christopher Bloch (Biological Sciences)
*Preliminary assessment of the diamondback terrapin population at Allens Pond Wildlife Sanctuary*

POSTER SESSION II: MOAKLEY CENTER ATRIUM  
(1:50 pm – 2:45 pm)

- **Poster #2** – John Ballarino, Mentor: Dr. Minae Savas (Foreign Languages)
  *The Contingency of Feminine Identity in Japanese Psychological Thriller Anime: The Illusional World of Satoshi Kon’s Perfect Blue*

- **Poster #4** – Daliza Cardoza, Mentor: Dr. Ed Brush (Chemistry)
  *Evaluation of Air Quality Sensors as a Tool to Educate Middle School Children on the Environmental and Social Injustices Resulting from Exposure to Diesel Exhaust*

- **Poster #6** – Julianne Hooper, Mentor: Dr. Ed Brush (Chemistry)
  *Bridging the Educational Divide Between Diesel Use and Social Justice: A Participatory Action Research Approach*

- **Poster #8** – Angela Forte, Mentor: Dr. Kenneth Adams (Biological Sciences)
  *Examining the Effect of Aβ on Levels of the Neuroprotective Protein PARC in Brain Cells*

- **Poster #10** - Shane Johnson, (NASA Space Grant), Mentor: Professor Jamie Kern (Physics)
  *Photometric Observation and Analysis of Supernova J081659.74+511233.7 and Search for New Supernova in Multi-Galactic Fields with BSU’s 14 “Celestron Edge HD Telescope and Apogee Alta U47 CCD Camera”*

- **Poster #12** – Krista Greeley, Mentor: Dr. Tammy King (Chemical Sciences)
  *Determining the Effectiveness of Bioretention Systems in Removing Toxic Heavy Metals from Stormwater Runoff*

- **Poster #14** – Sergey Kletsov, Mentor: Dr. Kenneth Adams (Biological Sciences)
  *The Role of NF-kB in Neuronal Differentiation*

- **Poster #16** – Phoebe Kurriss, (Center for Sustainability Grant), Mentor: Dr. Edward Brush (Chemical Sciences)
  *Application of Green Chemistry Principles to Improve the Efficiency of Biodiesel Synthesis from Waste Vegetable Oil: Optimizing Methanol Use and Recovery*
• **Poster #18** – David Lewis, (Center for Sustainability Grant), Mentor: Dr. Tammy King (Chemistry)
  Extraction of Oil and Grease Contaminants from Stormwater Samples to Facilitate Nutrient Testing

• **Poster #20** – Brandon Mash, Mentor: Dr. Steven Haefner (Chemistry)
  Investigations into Novel Dipalladium and Diplatinum Complexes Supported by a Functionalized Formamidine: Towards the Development of New Metal-Organic Frameworks

• **Poster #22** – Michelle Mattos, Mentor: Dr. Sam Lone (Chemical Sciences)
  Characterization of the Lesion Bypass Activity of Rev1 with the Carcinogenic DNA Adduct 1, N-6 Etheno Deoxyadenosine

• **Poster #24** – Steven Oikarinen, Mentor: Dr. Tom Wu (MAHPLS)
  The Kinematic Analysis of the Kettlebell Swing in Lumbar Spine

• **Poster #26** – Brooke Pacheco, Mentor: Dr. Pamela Russell (MAHPLS)
  Effects of a Ten-Week Periodized Resistance Training Program on Speed Performance Variables

• **Poster #28** – Kevin Roebuck, (Center for Sustainability Grant), Mentor: Dr. Edward Brush (Chemical Sciences)
  Development of Green Chemistry Metrics and Assessment Plan to Evaluate Research on the Efficiency of Biodiesel Synthesis from Waste Vegetable Oil

• **Poster #30** – Leonard Sprague, (2015 Norris/Richards Summer Research Scholarship from the Northeastern Section of the American Chemical Society), Mentor: Dr. Edward Brush (Chemical Sciences)
  Applying 1H NMR Spectroscopy to Develop a Kinetic Model for the Transesterification of Glycerol Fatty Acid Triesters

• **Poster #32** – Elizabeth Slate, Mentor: Dr. Stephen Waratuke (Chemical Sciences)
  Revisiting a Classic Chemical Reaction ‘Exploring the Effect of Lewis Acids on the Diels-Alder Reaction’

• **Poster #34** – Femi Stoltz, Mentor: Dr. Melinda Tarsi (Political Science)
  2014 in Black & White: A Measure of Policy Attitudes & Structural Conditions of the American Electorate

• **Poster #36** – Jasmin Vasconcelos, Mentor: Dr. Laura Boutwell (Social Work)
  Transition to Independence: Building Supportive Relationships with Young Adults Aging out of Foster Care

### ORAL PRESENTATION SESSION IV

**2:45 pm – 4:00 pm**

**2:45 pm**  
**Brianna Cataldo**, Mentor: Prof. Bruce Machart (English)  
*People Are Oceans: Narrative Craft, Unreliable Narrators, and the Psychology of Addiction in Young Adult Fiction*

**3:00 pm**  
**William Tringali**, Mentor: Dr. Heidi Bean (English)  
*Kiss Me with Those Red Lips: Queer Monstrosity and the Cultural Rhetoric of the Vampire*

**3:15 pm**  
**Caitlin Bradley**, Mentor: Dr. John Sexton (English)  
*The Hand that Steers 1,000 Ships: The Journey of the Heroine*

**3:30 pm**  
**Marie Doyon**, Mentor: Dr. Donald Running (Music)  
*Setting Poems of Female Writers in the Style of 19th Century Art Songs*

**3:45 pm**  
**Aaron Roberts**, Mentor: Dr. Jody Weber (Dance)  
*The Trouble with Masculinity*

### ICE CREAM SOCIAL – MOAKLEY CENTER ATRIUM

**4:00 pm – 4:30 pm**
ABSTRACTS  (Organized by Session)

ORAL PRESENTATION SESSION I  (9:00 am - 10:05 am)

Tamara Stevens, Mentor: Dr. Emily Field (English)  
*Rising up through the Rhythm of the Soul: African American Artists’ Response to Police Violence in Poetry and Song*

The relationship between the African American community and law enforcement has always been one between the overseers and the watched. The recent spate of high-profile African American deaths at the hands of the police force has brought such violence to the forefront of America’s consciousness. As shown in Douglas Blackmon’s *Slavery by Another Name: The Re-Enslavement of Black Americans from the Civil War to World War II* and Michelle Alexander’s *The New Jim Crow: Mass Incarceration in the Age of Colorblindness*, that relationship has changed little since Emancipation; what has evolved is the language poets use when engaging in the discussion of police violence. Before dashcams and cell phone videos, poets told of the African American community’s experiences with law enforcement and police violence through poetry and song. The purpose of this project is to examine the poetry and song lyrics that African American artists have created. Utilizing both traditional and electronic research, I compiled a historical timeline of poetry that references violent interactions with the law, both explicitly and implicitly. Through close literary analysis, coupled with sociological and historical research, I have found that the poems that deal with this subject matter fall into three categories: Topical Poems, which respond to a contemporary event; Consciousness Poems, which are meant to raise awareness of police violence; and Masked Poems, which carry a hidden or secondary meaning. These groupings have evolved over time, reflecting the African American community’s developing ability to push back against the dominant culture. One aspect of contemporary poetry I have identified is the use of relentless repetition to expose how Americans have become so desensitized to police violence against African Americans that it has been relegated to a meaningless cultural meme; poets use the formal feature of anaphora to lodge a protest against America’s desensitization. A collection of this type has not been produced before; when studied longitudinally, these poems offer valuable insight into the relationship between African Americans and law enforcement, and by extension, between African Americans and the dominant culture.

Alyssa Amaral, Mentor: Dr. Emily Field (English)  
*Moving Past Race?: Contemporary African American Authors’ Revisions of 19th-Century Race Conversations*

This essay examines how Mat Johnson and Colson Whitehead, African American authors of contemporary apocalyptic novels, extend and revise racial conversations present in the nineteenth-century novels of Edgar Allan Poe and Herman Melville, white canonical authors whose novels interact with elements of non-fiction travel writing. This essay explores how Johnson’s *Pym* (2011) extends Poe’s *Arthur Gordon Pym’s* (1838) chromatic categories, but more illuminatingly, how Johnson leverages Poe’s racism to critique the contemporary ideology of colorblind racism, as described by Eduardo Bonilla-Silva’s *Racism without Racists*. Modifying Dana D. Nelson and Toni Morrison’s emphasis on racial binaries and Douglas Ivison and Bruce A. Harvey’s narrow focus on racial dichotomies, I argue that approaching race in these novels by mapping out the racial triangles, not racial dichotomies, allows a more complex understanding. Through this comparative focus, I contend that the novels illustrate America’s state of racial linearity, or its racial flat-line. In other words, this essay contributes to our contemporary racial debate on America’s alleged state of post-racialism. Taken together, Johnson’s *Pym* and Whitehead’s *Zone One* (2011) suggest that racism has merely been replaced with a more subtle yet equally harmful form of racism, and therefore, that America has failed to become post-racial. This essay also considers Poe and Melville’s use of travel writing elements and Johnson and Whitehead’s adherence to conventions of the apocalyptic genre. Through this focus, this essay contends that Johnson and Whitehead’s novels reflect twenty-first-century America’s failure to adequately correct racial conceptions present in nineteenth-century antebellum America. Therefore, travel writing, a genre full of initial discoveries, has evolved into the apocalyptic novel where our failure to embrace, learn, and grow from nineteenth-century discoveries results in the imminent demise of humanity and all racial conception.
Sarah Peck, Mentor: Dr. Brian Payne (History)
The Biological and Cultural Ramifications of Animal Husbandry and European Vermin in the New World: A Focus on New England

The general success of Plimoth Plantation and the Massachusetts Bay Colony was established by the actions of influential and powerful individuals; yet, to the astonishment of many people, the presence of European animal species in North America presented a wide array of zoonotic diseases unknown to the pre-European colonized Americas, and these diseases indirectly impacted European-Native relations leading up to King Philip’s War. Recent scientific research, archaeological discovery, and historical interpretations of primary source colonial documents show the presence and date the existence of European animals in New England as early as 1524. Primary source documents serve as prime ethnographic documents describing Wampanoag life post-contact. This project involved exploring just how the presence of foreign European species drastically affected New England Indigenous populations biologically and culturally and shaped the geopolitical landscape of said populations during the fifteenth and sixteenth century. This paper is a social construction, it approaches understanding disease in history by reconstructing past experiences, past meanings, and past perspectives. This research showed how zoonotic diseases affected native populations in a socially, culturally, and economically devastating manner. In collaboration with recent scientific reports a more conclusive study can be made with a humanist standpoint looking at social forces and human agency without making a too simplistic of a claim of saying it was genetic and microbial forces alone that forced massive depopulation challenging decades of inaccurate racial theories regarding colonial development.

Gabby Desmarais & Melanie Hawes, Mentor: Dr. Brian Payne (History)
Examining the Ethnic Tensions in the Arctic

Over the course of the summer, our project deviated from an investigation into ethnic tensions in the Arctic whaling industry to one that is now focused on first contact between outsiders and the local Inuit. The story of contact in the Canadian Arctic is a field of great potential for historical investigation. By the twentieth century, a great diversity of people became interested in the Arctic region and its people. Beginning with whalers and explorers like George Comer and Vilhjalmur Stefansson and ending with the Royal Canadian Mounted Police and the Canadian Armed Forces outsiders developed a keen interest in the local culture of the Inuit. Whalers and explorers became amateur anthropologists who saw the Inuit as relics of the Stone Age as well as a potential source of profit via trade of fur for the American consumer market, Inuit cultural items for museums, and even face casts and bones. Meanwhile, the Canadian military found Inuit knowledge of the local environment as essential to national defense both during WWII and the Cold War. Like the explorers, whalers, and amateur anthropologists those working for the Canadian forces exchanged items and ideas as the Inuit offered their knowledge of the land and its environment in exchange for medicines, tools, and employment. Although our project has deviated from its original goals, the result is actually far more interesting and rewarding for both us and the field of historical investigation into the Canadian Arctic.

POSTER SESSION I: MOAKLEY CENTER ATRIUM (10:05 am - 11:00 am)

Poster #1
Nicole Akin, Mentors: Drs. Jennifer Manak & Ryan LaBrozzi (Elementary Education)
Your Story, Your History: Social Studies and History Instruction in a Nicaraguan Primary School

In the latter half of the 20th century, the country of Nicaragua experienced major political upheaval, which not only affected political, social and economic policies, but education as a whole. Education has been a constant struggling in Nicaragua – this country is the second poorest in Latin America, and has the highest dropout rate in Latin America with 52% of individuals leaving before finishing their primary school education. This change in government, the Sandinista movement, rallied the country together, and in turn celebrated a rich culture and history of Nicaragua, which can be found in primary school social studies classes. This qualitative and naturalistic study investigated the social studies and history curriculum present in Nicaraguan schools, as well as which
strategies and methods were utilized in instruction. Multiple data collection methods were employed, including participant observations in primary classrooms, field notes, administrator and teacher interviews, and the collection of student and teacher artifacts. The findings of this study demonstrated how social studies is directly taught in the classroom primarily by rote memorization as well as informal instruction by cultural influences prevalent throughout the country. Findings also demonstrated a concentric circle model of learning social studies and history in this particular public school. Social studies instruction was frequently integrated into other subjects such as language and literature as well as the natural sciences. While Nicaraguan classrooms have limited time allotted to social studies instruction as well as insufficient resources, this study successfully demonstrates that these educators are not stopped by shortcomings and obstacles that are faced involving the instruction of social studies.

Poster #3
Kristen Arnold, Mentors: Drs. Jennifer Manak & Ryan LaBrozzi (Elementary Education)

*Literacy Teaching and Learning in a Nicaraguan Primary School*

Nicaragua, the second poorest country in Latin America, has a population of approximately 5.8 million that includes nearly 1.7 million school age children and youth. According to UNESCO, Nicaragua has the highest dropout rate in Latin America with 52% of children leaving school without completing their primary education. As a result, 22% of Nicaragua’s population is illiterate. This qualitative and naturalistic study examined the teaching and learning of literacy in a Nicaraguan primary school in the fifth largest city in Nicaragua. Multiple data collection methods were employed, including three weeks of participant observations, field notes, semi-structured teacher and parent interviews, and the collection of school and teacher artifacts. These research methods were used to examine the nature of literacy instruction and learning in a Nicaraguan primary school, the strategies and methods teachers in Nicaragua used for literacy instruction, and the scope and sequence of literacy instruction in Nicaragua. The findings of this study demonstrated that literacy teaching and learning included scheduled times for instruction each day, with heavy emphasis on decoding in primary grades and guided, literal comprehension in intermediate grades. The majority of instruction included rote memorization and copying from language textbooks with few outside resources. Findings of this study have led to a better understanding of the Nicaraguan primary school system and the nature of literacy teaching and learning in Nicaragua.

Poster #5
Molly Bennett, Mentor: Dr. Patty Emmons (Elementary Education)

*Making Learning hAPPen: Exploring the Benefits of Using iPads to Enhance the Learning of Geometry in an Eighth-Grade Classroom*

The purpose of this qualitative study was to see if iPads are more effective than traditional teaching methods when teaching volumes of cones, spheres, and cylinders in an eighth-grade geometry class. Research was conducted throughout one week in two different eighth grade concepts of pre-algebra classrooms in an urban middle school in Metro West, Massachusetts. Each group took a pre-assessment to determine their baseline knowledge. One group, the iPad Group, was taught five lessons using an iPad. These lessons included the use of Google docs, the iPad camera and the Doodle Buddy app, to review material, solve volume problems, solve word problems as well as to find the volumes of real life objects like tennis balls, party hats and cans of soup. The second group, the Non-iPad Group, was taught five similar lessons using traditional teaching methods. Both groups took a post-assessment identical to the pre-assessment. All students improved their scores on the post-assessment. The average post-assessment score for the iPad group was 51% higher than the average pre-assessment score, whereas the non-iPad group averaged a 40% improvement. Based on the results of the student survey, 75% of the students in the study agreed or strongly agreed that they found it easier to learn when they worked on problems individually and at their own pace. Data will continue to be analyzed for deeper and more advanced patterns. Preliminary results indicate the importance of integrating technology in the middle school classroom to help students meet learning objectives and as a means to get students engaged and interested in more abstract math concepts.
Poster #7
Nicholas Bryden, Mentor: Dr. Thaya Paramanathan (Physics)

Quantifying Binding of Binuclear Ruthenium Complex (λλ-P) to DNA Using Optical Tweezers

Optical tweezers use focused lasers to hold and control biomaterials in order to examine them on a single-molecule level. By utilizing this technology, biophysicists have made important advances in the field of cancer drug research by making it possible to study the effects that these drugs have on DNA. We used optical tweezers to observe and analyze the effects of one of these prospective drugs in particular, a binuclear ruthenium complex (λλ-P) at Northeastern University. By stretching the DNA, we can open up the DNA base pairs and imitate the state that DNA goes through during cell division as it occurs naturally in the human body. We were able to study the effect at different levels of drug (λλ-P) concentrations by exerting particular force on DNA. We will use this data to characterize their binding properties quantitatively. Ultimately, this will help the development of new drugs for cancer treatment.

Poster #9
Brian Daudelin, Mentor: Dr. Thaya Paramanathan (Physics)

Advanced Optical Tweezers for Undergraduate Biophysical Research

Our summer ATP research project focused on creating the first phase of dual-beam optical tweezers for future undergraduate biophysical research. Construction of the optical tweezers began with the design of a compressed air system produced by an air compressor to float the optical table, which hold the optical components of the tweezers. Then we began construction of the computer-controlled stages to maneuver the flow cell, where the biomaterials are held. Finally, we built the optics around it and aligned the camera to view the flow cell. Currently we are in the process of setting up the lasers to trap tiny particles inside the flow cell. This summer research project is the first step in not just creating a state of the art Optical Tweezers instrument, but a first step in creating a working Single Molecule Biophysics (SMB) lab here at BSU to study potential cancer drugs.

Poster #11
Melissa Habboub, Mentor: Dr. Edward Carter (Special Education)

Understanding Factors that Impact the Use of Economical iPad Applications to Advance Communications Skills for Students with Autism Spectrum Disorders

The iPad offers hundreds of applications for enhancing communication for non-speaking individuals diagnosed with Autism Spectrum Disorders. Many of the favored applications currently in the field cost well over one-hundred dollars. The purpose of this project was to explore low-budget, defined as twenty dollars or under, iPad applications designed to enhance communication for students who are non-speaking, like those with Autism. Using a three-phase process, the investigator rated twenty-four applications across five criteria defined in the literature; surveyed sixteen teachers, and their preferred criteria for selecting and using iPad applications; interviewed six teachers and their roles regarding iPad use in the classroom; and performed a discrepancy analysis between the teacher feedback and the previous application ratings. Results indicated the five most highly rated, cost effective, and teacher preferred applications are: AlexicomAAC; Avaz Together: Picture Communication; Digital Picture Communication; Functional Communication System; and iClick iTalk. The investigator's results supported the concept that iPad applications that enhance communication for non-speaking individuals, not only could be cost effective, but that these applications are also the most compatible with the teacher criteria of Ease of Use, Student Motivation, and Customization Preferences.

Poster #13
Arianna Zikos, Mentor: Dr. Vignon Oussa (Mathematics)

A Canonical Classification of Coordinate Systems in \( \mathbb{R}^3 \)

A coordinate system is a system that uses one or several numbers to uniquely represent the position of an object living on a manifold. Once a coordinate system is fixed on a given space, any motion can be described by a set of suitable equations. In order to describe a specific motion in simple ways, it is important to make a careful choice of
a coordinate system which is compatible with the geometry of the motion. To the best of our knowledge, there is no procedure available in the literature which addresses this problem in a fully satisfactory manner. The chief objective of the present project is to provide a complete classification of all coordinate systems arising from one-parameter groups acting on a three-dimensional vector space. First, we show that all classical coordinate systems occur from some one-parameter matrix group acting linearly on a Euclidean space. Secondly, by exploiting well-known techniques such as the spectral decomposition of linear operators (Jordan canonical form of matrices), matrix exponentiation, and a precise layering procedure, an exhaustive list (up to a choice of cross-sections) of all coordinates arising from linear actions of one-parameter groups in dimension three is obtained.

**Poster #15**

**Catherine Joyce**, Mentor: Dr. Melissa Brandon (Psychology)

*Does the Addition of an Auditory Stimulus Increase a Participant’s Accuracy to Visually Predict a Prescribed Pattern?*

Rhythm is constantly perceived via our senses, specifically audition and vision. However, little research has been published on how we use visual rhythm to plan responses to rhythmic events and achieve synchronization. Previous studies demonstrate that infants and adults visually predict temporal patterns on a computer screen. The current study explores whether the addition of an auditory stimulus to a visual rhythm increases an adult’s accuracy to achieve synchronization was a multisensory rhythm. To assess synchrony, participants were randomly assigned to either a rhythmic timing condition or a random, jittered timing condition. An Applied Science Laboratory (ASL) eye tracker, a non-invasive instrument designed to monitor participants’ eye movements throughout the experiment, used real-time data to allow the auditory stimulus to be contingent upon participants’ anticipation of the upcoming visual stimuli. These findings will add to the published literature on multisensory rhythm perception and contingent looking methodologies, as well as encourage new ways to integrate rhythm with education and technology.

**Poster #17**

**Terrence Kelleher**, Mentor: Dr. Shannon Lockard (Mathematics)

*Exploring the Linear Independence of Matrix Represented Dihedral Groups when Multiplied by a Vector*

There are many ways to secure data for safe transfer. One such way is to use an error correcting code which ensures data will be well received regardless of whether it incurs an amount of damage. This project examined the mathematics behind one method of error correction. Let \( \mathbf{v} \) be a vector in \( \mathbb{R}^n \) and let \( \mathbf{v} \ast D_{2n} \) be the multiplication of \( \mathbf{v} \) with every element in the matrix representation of \( D_{2n} \). The vector \( \mathbf{v} \) has the Haar property if and only if every set of \( n \) vectors in \( \mathbf{v} \ast D_{2n} \) is linearly independent. For this project we give a characterization of vectors in \( \mathbb{R}^3 \) that satisfy the Haar property, and work for similar results in \( \mathbb{R}^4 \) and \( \mathbb{R}^5 \). We know that for \( \mathbb{R}^4 \), we cannot find the Haar property when examining \( n \) vector subsets. In addition we know that some vectors with 2 equal components have the Haar property and some do not. For the \( \mathbb{R}^5 \) case, vectors with at least three equal components do not have the Haar property and vectors with at most two equal components will. These conjectures will be the focus of work in the future.

**Poster #19**

**Andrew Leonard**, Mentor: Dr. Sandra Neargarder (Psychology)

*The Relationship between Circadian Dysfunction and Cognitive Impairment in Individuals with Parkinson’s Disease*

Parkinson’s disease (PD) is a brain disorder associated with a variety of motor (e.g., rigidity, tremor) and nonmotor (e.g., cognitive impairment, sleep dysfunction) symptoms. Recent evidence suggests that PD patients may also have dysfunctional circadian rhythms: oscillators responsible for many behavioral and physiological functions (e.g., sleep-wake cycle, cognitive performance). No study to date has measured both circadian rhythms and cognitive functioning in the same group of PD patients to examine their potential relationship. This was the aim of the current project. The archival data set used for this study included 34 PD patients and 12 normal control participants (NC) matched for age and education. Cognition was measured through a series of neuropsychological tests measuring memory and executive functioning. Archival circadian rhythm data, collected through watch
actigraphy, was analyzed using three nonparametric variables; relative amplitude (RA), interdaily stability (IS), and intradaily variability (IV). Higher RA and IS values indicate a more stable rhythm, while higher IV values indicate a less stable rhythm. Patients with PD had significantly higher RA values than NCs, however, there was no significant difference between PDs and NCs in IS or IV values. There was a significant positive correlation between executive functioning and RA and IS values in PDs. No significant correlations were found between executive functioning and IV values or between working memory and RA, IS, or IV values among PDs. This preliminary evidence suggests that disrupted circadian rhythm in PD patients may be related to cognitive impairment. Future research should investigate this potential link by using additional and more sophisticated circadian rhythm measures. This, in turn, could shed more light on the role circadian rhythm dysfunction plays in the cognitive impairment of PD patients and thus highlight the potential need for new treatment and intervention strategies aimed at improving the quality of life of PD patients.

**Poster #21**

**Kristen Merrill, Mentor: Dr. Jennifer Manak (Elementary & Early Childhood Education)**

*Exploring the First Encounters from Multiple Perspectives through Critical Literacy Discussions in a Fifth-Grade Classroom*

Teachings of the first encounters between the Native Americans and European explorers/settlers are required by the Massachusetts Curriculum Frameworks for fifth-grade students. Textbooks typically share history from a single perspective while culturally authentic children’s literature shares historical events from multiple perspectives. A more well-rounded understanding of a historical event can be achieved through the incorporation of quality children’s literature into the curriculum. Critical literacy discussions can also be used to enhance the students’ understanding by questioning the text’s message as well as which voices may be missing. This study examined how reading and critically discussing quality children’s literature about the first encounters influenced students’ understanding of this historical time period. This naturalistic, descriptive study was conducted in a fifth-grade classroom in a suburban elementary school in southeastern Massachusetts. Various forms of data were collected including participant observations, field notes, pre/post assessments, digital recordings of classroom discussions and semi-structured interviews with the students and teacher. From this data, I found that the students were able to understand the multiple perspectives of the first encounters more accurately through the use of critical literacy discussions of culturally authentic children’s books. The students initially viewed the first encounters from the settlers’ perspective and thought that the Natives were the antagonists. As the study progressed the students learned how to question the texts, investigate the background of the author of the text, and question what voices may have been missing. At the end of the unit, students developed an understanding of the complex nature of the interactions between the Wampanoag and Settlers. In addition, students were able to build a whole picture of the events surrounding the first encounters.

**Poster #23**

**Guillermo Ortiz, Mentor: Dr. Irina Seceleanu (Mathematics)**

*Modeling the Consequences of Reduced Vaccination Coverage on the Spread of Measles*

A recent anti-vaccine movement has led to a resurgence of measles in the US as more and more parents choose not to vaccinate their children. Given this increasing trend of vaccine skeptics opting out of immunization programs, we created a stochastic model simulating the spread of measles in small communities with the goal of studying the long-term consequences of increased levels of unvaccinated individuals on the number and duration of measles outbreaks. We constructed a probabilistic model using the resistivity levels in the population for vaccinated and unvaccinated individuals, average duration of a measles infection, and different models simulating the number and geographic distribution of contacts. We also utilized the model to run simulations that visually represent the spread of measles in a small community. Moreover, by accounting in our model for regional differences for vaccination levels in the population, we can predict how pockets of unvaccinated people affect the outcome of the system both regionally and nationally. Our project will help to better explain the effects that the individual choice
not to get vaccinated can have on the entire US population, and thus raise awareness for the importance of vaccination and the shared responsibility for reducing outbreaks through individual immunization.

Poster #25
Renee Precopio, Mentor: Dr. Laura Ramsey (Psychology)

*Dude Looks Like a Feminist! Morality and Feminism Among Men*

Even though male participation in feminism is essential to its success, it's possible that men are reluctant to get involved in the movement because it is primarily associated with women (Holmgren & Hearn, 2009). This research investigated whether morality contributes to men endorsing feminism. According to the Moral Foundations Theory, there are five morality factors: harm (i.e., the concern for someone’s physical and emotional well-being); fairness (i.e., the concern for equality and justice); ingroup (i.e., the concern for loyalty to group membership); authority (i.e., the concern for tradition and the social hierarchy); and purity (i.e., the concern for physical and spiritual cleanliness, Graham, Nosek, Haidt, Iyer, Koleva & Ditto, 2011). Graham and colleagues (2009) found that harm and fairness correlate to liberalism; therefore, we predicted that men’s feminism would be associated with an increased emphasis on those morality factors and a decreased emphasis on ingroup, authority, and purity. Using an online survey methodology, participants were assessed on various aspects of feminism and morality. The results generally supported our predictions that higher support for conservative moral values correlates to less endorsement of feminism, whereas higher support for liberal moral values correlates to more endorsement of feminism, even when controlling for political ideology. This research contributes to our understanding of male resistance to and support of the feminist movement.

Poster #27
Emanuel Zanzerkia, Mentor: Dr. Kevin Rion (Mathematics)

*A Critical Analysis of Random Response Techniques*

Domestic violence is a topic that has recently been at the forefront of public attention. In order to understand and make informed decision on sensitive topics such as domestic violence, interviews have been used to collect data on these topics. However it is difficult to assess how truthful respondents are since they may not feel at ease revealing the truth to an interviewer. Surveyors of sensitive issues face the problem that respondents may be reluctant to answer truthfully since the respondent may feel pressured socially or may fear the repercussions of their truthful answer. Processes known as random response techniques have been introduced to allow interviewers the ability to extract information they need for a population, while preserving privacy of individual respondents by introducing randomness to the surveying process. The focus of this project was to critically assess the accuracy of two such techniques and the level of privacy protection afforded to the respondent by the techniques. Using the method of moment matching, estimators of the population proportion were created for both techniques. Once the estimators were created, the accuracy of the estimators could be assessed by studying the variance. Finally we measured the level of privacy protection afforded to respondents by each technique by calculating mutual information and entropy. This research will help policy makers and researchers in many fields by allowing them to choose a surveying method that is optimized for their specific requirements.

ORAL PRESENTATION SESSION II  (11:00 am – 12:00 pm)

Nicholas Pasciuto, Mentor: Dr. Ward Heilman (Mathematics)

*The Mystery of Non-transitive Grime Dice*

For centuries people have been playing versions of the zero sum, non-transitive game known as Rock, Paper, Scissors. Now we have what are known as Grime dice, a set of 5 non-transitive dice with rules that work similar to Rock, Paper, Scissors. We analyze and explore the properties of these dice including the counter-intuitive order-reversing aspect. Then we use that understanding to determine where and how the order-reversing characteristic of Grime dice breaks down as the number of dice increases. Finally, we create several new sets of non-transitive
dice. These, together with other designs, allow us to exhibit sets of 3 dice, which contain at least one non-transitive cycle for each of the Platonic solids.

**Jasmin Hicks**, Mentor: Dr. Joseph Seggio (Biological Sciences)

*The Physiological and Behavioral Effects of Wheel Running on High Fat Diet in C57BL/6J Mice*

It is widely accepted that lifestyle plays a crucial role on the quality of life in individuals, particularly in western societies where diet, commonly high in fats (HFD), is correlated to increased cognitive decline and increased possibility of developing Type 2 Diabetes mellitus (T2DM). When C57BL/6J (B6) mice are fed a HFD they are prone to obesity and T2DM which commonly manifests itself as insulin resistance. HFD consumption has also been shown to negatively impact proteins associated with anxiety. This experiment investigates how HFD consumption and exercise affect aspects of behavior like anxiety and physiological responses such as body mass, insulin, c-peptide and glucose tolerance in B6 mice. B6 mice were kept under 12:12 Light-Dark cycle and individually housed in locked or unlocked running wheel cages. Mice were fed water and HFD or regular chow (RC) ad libitum. Glucose tolerance and behavioral assays were conducted at aged weeks 11 and 16 and insulin and c-peptide were measured at aged week 18. Wheel running alone decreased anxiety in the first 5 minutes of the open field assay but no difference was found among the HFD and RC groups. Wheel running also decreased body mass in mice fed HFD until week 18 but had no effect between RC groups. HFD significantly decreased glucose tolerance at aged week 18. Insulin levels in HFD W group was significantly lower than HFD NW, there was no difference in c-peptide among any of the groups. These results indicate that that individuals fed HFD and given access to a running wheel show less anxiety in an open field and have better physiological responses such as decreased body mass, improved glucose tolerance and insulin compared to mice fed HFD with no access to a running wheel.

**Christopher McDonald**, Mentor: Dr. Vignon Oussa (Mathematics)

*Classification of Wavelet Sets on the Real Line*

Wavelets are mathematical tools used to represent signals such as audio files, pictures, videos, and various other types of data. At this point, Wavelet Theory is a mature subject, and the literature contains a body of techniques used to design wavelets. One of these techniques relies on the construction of wavelet sets (sets tiling the real line by successive integral shifts and dyadic dilations). In the present project, we obtain a complete characterization of wavelet sets of four intervals. This extends results of wavelet experts M. Bownik and K. Hoove who recently characterized wavelet sets of two and three intervals. More precisely, we show that there are three possible configurations of wavelet sets of four intervals, and for each configuration, we provide an explicit characterization of the corresponding wavelet sets. Among various mathematical objects used in our characterization, the symmetric group $S_4$ (the group of 24 permutations on 4 symbols) appears as a central tool. Furthermore, special attention is paid to the case of wavelet sets which are symmetric. That is, wavelet sets which are up to boundary points, invariant under multiplication by negative one. More precisely, we prove that any symmetric wavelet set of four intervals can only be ordered by a rotation of the permutation $(4\ 3\ 2\ 1)$.

**Jason Covert**, Mentor: Dr. Robert Hellström (Geography)

*Impact of the El Niño-Southern Oscillation on Atmospheric Conditions within Tropical Pro-Glacial Valleys*

El Niño Southern Oscillation (ENSO) is known to be the primary modulator of inter-annual weather patterns in the Andes, but its impact in the Cordillera Blanca (White Range) is not fully understood. In 2004 an autonomous sensor network (ASN) consisting of six air temperature/humidity micro-dataloggers and two automatic weather stations was installed in the glaciated Llanganuco Valley, Cordillera Blanca, Peru. This project demonstrates the viability of the ASN for evaluating the impacts of ENSO on meteorological forcing within pro-glacial valleys with geophysical characteristics similar to that of Llanganuco. Twenty-four hour composites of wind, air temperature, and precipitation data obtained from the ASN were created for the historical wet and dry seasons in the Valley. Analysis of the composites between the years of 2005 and 2015 suggest connections between ENSO cycles and meteorological forcing within the Valley. Preliminary evidence reveals microscale meteorological patterns which are unique to El Niño and La Niña events. The value and challenges of working with ASN data in remote valleys for
inter-annual hydrometeorological investigations are discussed. In support of future studies, instrumentation for measuring cloud-cover remotely has been developed and deployed along with new satellite dataloggers at both weather stations of the ASN. The upgrades to the ASN provide new, near-real-time, data via satellite link throughout the year improving the reliability of data access significantly. Although the sporadic availability of historical data prevents definitive conclusions at this time, recent improvements in the ASN infrastructure will facilitate deeper understanding of ENSO impacts on meteorological forcing within pro-glacial valleys of the Cordillera Blanca.

ORAL PRESENTATION SESSION III (12:45 pm – 1:50 pm)

Emily Wiegand, Mentor: Dr. Allyson Ferrante (English)

Unearthing Herstory: Women’s Participation in Creating Jamaica’s National Identity

So often, native literature is silenced by the limited study of Western writing in the colonial English curriculum Jamaica operates under. Despite the country’s independence in the 1960s, Jamaicans continue to promote ideologies that are rooted in the discrimination of anyone other than white, Western males. Specifically Jamaicans work to advance their own status through the racial and gender discrimination of their own people. This project works to combat the colonial system of oppression so engrained in the natives’ minds by unearthing the writings of those lowest in the modern social hierarchy: marginalized, Jamaican female writers. Through a critical analysis of Jamaican short stories, theoretical texts and first-hand experiences throughout the country, I have uncovered the fundamental, yet often neglected, roles women have played in the creation and maintenance of the past, present, and future Jamaican culture. If able to implement their own country’s literature, that promotes Jamaican ideologies and models of family, the nation will be able to shape the future generations’ awareness of national identity and promote a postcolonial future filled with equality and community for all. If able to understand their nation’s postcolonial self-identification through local authors, common experiences, and relatable characters, the Jamaican students will become more aware of their own belonging on the path to the nation’s complete postcolonial emancipation.

Samantha Sawyer, Mentor: Dr. Christopher Bloch (Biological Sciences)

Effects of Decomposition of Carrion on Surrounding Arthropod Populations and Soil Nutrient Content

Arthropods play a large role in decomposition of vertebrate animals. This has been extensively studied and is well understood. Though we know what effects arthropods have on decomposition and what they can tell us about time of death, little research has addressed what effects decomposition has on insects and other arthropods. Effects of carrion decomposition on arthropod populations and soil composition were studied over a 10-week period. Arthropods were extracted from leaf litter using a tullgren funnel. Soil samples were collected using a soil core, and weather conditions were also observed to investigate any influence on arthropod populations. Non-carrion-associated arthropods were, on average, more abundant than carrion-associated arthropods, but the strength of the effect differed with increasing distance from carcasses and over time. The results of this study can provide valuable information to various fields of forensics.

Brad Carley, Mentor: Dr. Kenneth Adams (Biological Sciences)

Examining Post-Translational Modifications of Egr-1 for Prevention of Proteasomal Degradation

Early Growth Response protein (Egr-1) is a well-characterized transcription factor that plays important roles in regulating a number of genes, synaptic plasticity, strengthening of synapses, and neuronal differentiation. Egr-1 is also classified as a group of genes called immediate early genes (IEG’s); these are transcription factors that are rapidly and transiently induced due to a multitude of different stimuli in the cell and play a role the cellular responses to those stimuli. Egr-1 is also up-regulated in Alzheimer’s disease brains so understanding mechanisms of IEG’s especially Egr-1 will shed more light on cell function and roles in disease. Previous work in the lab shows that Egr-1 may undergo a post-translational modification in order to prevent its degradation in the cell. My goal is to identify a specific mechanism and protein that may be modifying Egr-1 and to specify the modification that Egr-1
1 undergoes. We have been using PC12 cells as our model and stimulating endogenous Egr-1 expression using nerve growth factor (NGF). We have also been using expression plasmids with a promoter that is unresponsive to NGF to induce exogenous Egr-1. Using techniques such as western blotting and real time PCR to measure protein, and mRNA levels of Egr-1 respectively, we have been running experiments under a variety of different treatments such as NGF, Cycloheximide, Actinomycin D, MG132 in order to identify a concrete mechanism for the post translational modification of Egr-1. Unfortunately, no concrete mechanism or protein has been identified thus far with our experiments; however, we will continue the research and experiments in hopes to collect conclusive evidence.

Kourtnie Bouley & Nicholas Hathaway, Mentor: Dr. Christopher Bloch (Biological Sciences)

Preliminary assessment of the diamondback terrapin population at Allens Pond Wildlife Sanctuary
Salt marshes, estuaries, bays, sounds and adjoining uplands are picturesque features of the coastline that serve as nurseries or homes for many species. One reptile in the United States is completely dependent on this habitat: the diamondback terrapin, Malaclemys terrapin. Diamondback terrapins are top predators in marshes, so they may be reliable indicators of a healthy ecosystem. This species is currently listed as threatened in Massachusetts, and Allens Pond is one of few sites known to support populations. However, no rigorous studies have been conducted to evaluate the conservation status of the population. The purposes of this study were to determine the size and structure of the terrapin population at Allens Pond, identify terrapin nesting areas, and analyze habitat characteristics and predation pressures. Twenty-three terrapins were collected, with the majority being juveniles and the sex ratio nearly 1:1. The presence of numerous deer, rabbits, and field mice, and only a few canids, suggests low local predation pressure. These data will form a valuable baseline for future research at Allens pond and comparable sites, and for the development of conservation and management strategies to reduce the risk of extinction, which may result in negative consequences throughout the entire ecosystem.

POSTER SESSION II: MOAKLEY CENTER ATRIUM (1:50 pm – 2:45 pm)

Poster #2
John Ballarino, Mentor: Dr. Minae Savas (Foreign Languages)
The Contingency of Feminine Identity in Japanese Psychological Thriller Anime: The Illusional World of Satoshi Kon’s Perfect Blue
The films of Satoshi Kon are driven by conflicts of identity, rooted in dissonant gazes of other characters and society in general. For this reason, Kon’s films are an excellent vessel for Post-Structural feminist criticism, which focuses heavily on the contingent nature of identity and provides a psychoanalytical framework through which to analyze his characters. In my research, I will use the ideas of a number of post-structural feminist thinkers to trace the external influences that shape the self-perception of the female protagonists of Satoshi Kon’s works, observing the conflict, which arises from these contending forces, how it is portrayed symbolically, and what ultimately leads to its resolution. In doing so, I expose a sophisticated critique of gender roles and identity within Japanese society and the entertainment industry, and more broadly of creating an identity in a post-modern world.

Poster #4
DaLiza Cardoza, Mentor: Dr. Ed Brush (Chemistry)
Evaluation of Air Quality Sensors as a Tool to Educate Middle School Children on the Environmental and Social Injustices Resulting from Exposure to Diesel Exhaust
The harmfulness of poor air quality is among frequent conversation on environmental evaluations. Numerous studies have demonstrated a relationship between heightened levels of particulate matter (PM) in ambient air and an increase in respiratory or cardiovascular mortality or morbidity. Diesel exhaust is a major contributor to amplified levels of PM. This project was focused on designing a Participatory Action Research program to be implemented into an educational curriculum seeking the involvement of middle school children in current issues relating to diesel emissions. This portion of the research was geared toward using personal PM sensors paired with a
Smartphone application as a way to inspect variability in PM exposure levels of children during daily commutes and regular activities. Throughout this research, various existing PM sensors and applications were assessed and compared to determine which could be used in the program being devised. Two new personal monitors were chosen as candidates, the first called TZOA, and the second referred to as AirBeam. They are both wearable and host their own Smartphone application that streams an individual's real time air quality data to their Smartphone. Each features a crowd sourcing function, allowing users across the country to access and share their data on a map. By showcasing a comprehensive and realistic depiction to participants, this project strives to examine the health and social complications that stem from incessant PM exposure. Ultimately, the goal is to encourage children to engage in education and advocacy within their community to resolve the severe ramifications that result from repeated exposure to particulate matter. This research was supported by the Bridgewater State University Adrian Tinsley Program, and a grant from the EPA P3 Program (SU835696).

**Poster #6**

**Julianne Hooper**, Mentor: Dr. Ed Brush (Chemistry)

*Bridging the Educational Divide Between Diesel Use and Social Justice: A Participatory Action Research Approach*

Participatory Action Research (P.A.R.) is a blooming educational outreach initiative that is sweeping throughout the United States, gaining well deserved attention as an educational approach to solving social justice issues. Our research team has initiated a study on populations who are more exposed and vulnerable to the effects of particulate matter from diesel exhaust, creating an issue of environmental and social injustice. As inner city children are particularly vulnerable to the negative health effects of diesel exhaust, P.A.R. is the ideal tool to both aid in learning about the multifaceted topic of diesel and its relationship to society, while giving these children an opportunity to conduct their own research and propose solutions to the problem. Our research team has collected and evaluated the important elements of P.A.R. and has incorporated them into an educational program for middle school teachers to utilize. Key elements of this program include journaling, class led discussions, activities to illustrate the overall lesson, group work, and student conducted research. Through this action, the necessary communicatory bond between the humanities and the sciences will be joined in one program to aid individuals who are being directly impacted by an environmental issue, turned social injustice, and will further contribute to the awakening of sustainable practice and the future of green chemistry. This research was supported by a summer research grant from the BSU Adrian Tinsley Program, and a grant from the EPA P3 program (SU835696).

**Poster #8**

**Angela Forte**, Mentor: Dr. Kenneth Adams (Biological Sciences)

*Examining the Effect of Aβ on Levels of the Neuroprotective Protein PARC in Brain Cells*

Dementia is a condition of mental decline that entails progressive memory impairment, which interferes with learning, communication, and living a normal life. Alzheimer’s disease, the most common form of dementia, is an aggressive neurodegenerative disorder characterized by the presence of two lesions in the brain called amyloid plaques and neurofibrillary tangles (NFTs). Amyloid plaques, composed of the small protein amyloid-β (Aβ), are neurotoxic in that they have been shown to contribute to the death of neurons. However, the mechanism by which Aβ contributes to neuronal death is poorly understood, so more research is needed to understand the mechanism. Interestingly, neurons are known for their resistance to cell death. A recent study has identified a novel protein called PARC that is present specifically in neurons and protects them from death. Therefore, this study aims to investigate if Aβ contributes to neuronal death by decreasing the amount of PARC in neurons. Using PC12 cells as a neuronal model, we investigated this by treating PC12 cells with Aβ generated from CHO cells that are modified to produce Aβ. Using western blot analysis and ELISA assays, we quantified the amount of Aβ in the CHO cell medium and detected PARC expression in the PC12 cells after Aβ treatment. Our preliminary results suggest a modest reduction in levels of PARC following Aβ treatment, however, more research is needed to confirm the effects of Aβ on PARC expression.
**Poster #10**

**Shane Johnson**, (NASA Space Grant), Mentor: Prof. Jamie Kern (Physics)

*Photometric Observation and Analysis of Supernova J081659.74+511233.7 and Search for New Supernova in Multi-Galactic Fields with BSU's 14 “Celestron Edge HD Telescope and Apogee Alta U47 CCD Camera”*

Photometric observations of type Ia supernovae J081659.74+511233.7, ASASSN-15la, ASASSN-15li, and ASASSN-15In were obtained with BSU’s 14” telescope and Apogee Alta U47 CCD on clear nights between February 27th and July 13th, 2015. Images were processed in MaxIm DL and lightcurves of the supernovae generated using MaxIm DL’s differential photometry tool. A Gaussian fit to the early redshift-corrected lightcurve of supernova J081659.74+511233.7 with RMS 0.9951 reveals a luminance decline of 0.27 magnitudes from peak to phase +15. We present light curves for each supernova target. Multi-galactic fields were imaged between May 22nd and July 11th, 2015 with no cataclysmic variables detected. Future work includes comparison of our luminance filter data to BVR passband data gathered for the three ASASSN objects to attempt to determine a width-luminosity relationship for type Ia supernovae in luminance magnitude.

**Poster #12**

**Krista Greeley**, Mentor: Dr. Tammy King (Chemical Sciences)

*Determining the Effectiveness of Bioretention Systems in Removing Toxic Heavy Metals from Stormwater Runoff*

At BSU, a bioretention area was put into place as part of the design of the “green” parking lot behind the Science and Mathematics Center. Stormwater runoff picks up debris, sediments and other pollutants as it flows through parking lots. These pollutants must be removed from stormwater runoff before reaching streams to prevent devastation of aquatic life. Stormwater samples were collected through automated systems located before and after the bioretention area, preserved with acid, then processed in the lab to solubilize all forms of lead (Pb) and cadmium (Cd). The amount of lead and cadmium were measured using a technique called atomic absorption spectroscopy following standard EPA method. Although we did not get a complete set of stormwater samples from all four sampling sites, the data that we obtained from two rain events revealed that the levels of cadmium was much lower than the EPA limit of 2 ppm, showing non-detectable levels of cadmium, so it was removed from the project. The data also showed to contain very small levels of lead. Both dissolved and total recoverable Pb were below the EPA water quality criteria of 65 ppm dissolved Pb, meaning that the runoff from the parking lot currently does not pose as a threat before entering the watershed. During the first rain event on June 4th, the data showed that some of the samples collected from MC-4, after bioretention, contained more total recoverable lead than the stormwater collected from MC-2, before bioretention, and comes from direct runoff from the parking lot. MC-1 and MC-3 both did not yield any samples. The higher levels of Pb after bioretention initially did not make any sense, but since total recoverable lead accounts for both dissolved and suspended (attached to sediment), we suspected that soil within the bioretention area could be eroding during heavy rain. We tested the soil near MC-1 (before bioretention) and MC-4 using a field portable device called X-ray fluorescence (XRF) spectrometer. Our soil Pb data confirmed our suspicion that the soil around MC-4 contains higher levels of lead than the soil surrounding MC-1.

**Poster #14**

**Sergey Kletsov**, Mentor: Dr. Kenneth Adams (Biological Sciences)

*The Role of NF-kB in Neuronal Differentiation*

Multicellular organisms require a wide array of special cell types for proper function and survival and therefore need a mechanism in place, which enables them to generate the various necessary cell types. In a variety of multicellular organisms, unspecialized cells are able to undergo certain internal changes that result in their transformation into anything from a neuron to a liver cell. This specialization process is called differentiation and occurs when unspecialized cells receive an external molecular signal, initiating the activation or repression of genes needed for differentiation to take place in the cell. To manage the regulation of genes, cells use a class of proteins called transcription factors to regulate genes by turning them on or off. The binding of a transcription factor to a DNA site preceding the start of the target gene facilitates the activation and regulation process.
Understanding the neuronal differentiation mechanisms is extremely important as it can shed light on potential treatments for many neurological diseases. This project uses PC12 cells, a very common model system used to study molecular interactions during neuronal differentiation, to investigate mechanism by which unspecialized cells differentiate into neurons. The focus of the project is on the transcription factor NF-kB, identified as one of several potential candidates responsible for upregulation of neuronal genes during the analysis of those genes. Previous work done by Dr. Adams indicates that transcription factor EGR1, identified in the same manner as NF-kB, is involved in PC12 cell neuronal differentiation. As a result the same experimental model was applied in this experiment, specifically Chromatin Immunoprecipitation (ChIP) to test binding levels of NF-kB and Real-time PCR (RT-PCR) to quantify the ChIP. Surprisingly, experiments thus far have not shown high levels of binding indicating that NF-kB does not play a role in the neuronal differentiation process as previously predicted. We conducted troubleshooting of the ChIP assay, checking the negative and positive controls as well as performing DNA electrophoresis to confirm the DNA segments used during the ChIP assay were the optimal size. Troubleshooting experiments did not produce data significantly different from previous ChIP and RT-PCR further suggesting that NF-kB is not a transcription factor involved in the differentiation process. Future experiments will be conducted to confirm the results of the ChIPs, as well to ensure the predicted results from the positive and negative controls are obtained.

**Poster #16**

**Phoebe Kurriss**, (Center for Sustainability Grant), Mentor: Dr. Edward Brush (Chemical Sciences)

*Application of Green Chemistry Principles to Improve the Efficiency of Biodiesel Synthesis from Waste Vegetable Oil: Optimizing Methanol Use and Recovery*

The process of synthesizing biodiesel from cooking oil is inefficient due to the wasteful use of reagents and water. My research addresses the excessive use of methanol, a required reactant in biodiesel synthesis. The challenges include a chemical equilibrium process, and production of methanol vapors that are hazardous and flammable. The goal of this research was to apply Green Chemistry principles to evaluate static fluid reflux condensers to optimize methanol recovery. Reflux condensers require the unsustainable use of cold water, and have explored static liquids to improve efficiency. Static liquids were selected based on their heat capacities: water, ethylene glycol, glycerol, and air serving as the control. Different styles of reflux condensers: Liebig, Allihn, Graham, and air condensers were also investigated. Our results with static fluids were compared with condensers using cold and room temperature flowing water recirculating in a closed system. Based on our data, we have found that using glycerol as the static fluid in an Allihn condenser has potential to make the biodiesel process more efficient and sustainable, reducing negative impacts on human and environmental health. This research was supported by a summer research grant from the BSU Center for Sustainability and Adrian Tinsley Program, and a grant from the EPA P3 program (SU835696).

**Poster #18**

**David Lewis**, (Center for Sustainability Grant), Mentor: Dr. Tammy King (Chemistry)

*Extraction of Oil and Grease Contaminants from Stormwater Samples to Facilitate Nutrient Testing*

Bridgewater State University’s Stormwater Monitoring System was designed as part of the West Campus “Green” parking lot. The parking lot uses a bioretention system to naturally filter the stormwater run-off before it mixes with the groundwater and continues to nearby streams and lakes. One of the key features of this system is the ability for the BSU Watershed Access Laboratory (WAL) to monitor concentrations of nutrients (nitrites, nitrates and phosphates) in the stormwater. Different storage areas in the system collect the stormwater at different stages along the bioretention filtering process. During rain events, the system automatically triggers the collection of stormwater samples from these different storage areas. Measuring the concentrations of the nutrients at these different staged areas is essential in understanding the success of the system. To date, stormwater samples have been collected, but unfortunately attempts to measure the concentrations of nutrients have been hindered due to laboratory equipment failure. To accurately measure nitrates, a cadmium column is used to reduce the nitrates to nitrites. This cadmium column is degenerating at a fast rate when used in conjunction with the stormwater
samples. Due to this degeneration, the cadmium column needs to be replaced at an alarming rate and the accuracy of the data collected through the equipment is suspect. According to the manufacturer of the equipment, the degeneration is thought to be caused by the presence of oil and grease contaminants emulsified in the collected samples. Therefore, it was the task of this research project to confirm the existence of oil and grease in the samples and, if there, implement an environmentally responsible method to extract the contaminants from the stormwater samples in a way that does not adversely affect the concentrations of nutrients. After trying many different methods, my recommendation based on ease of use, environmental considerations and cost, is to filter the samples using a 0.45 micron cellulose acetate filter prior to running the flow injection analysis.

**Poster #20**

**Brandon Mash, Mentor: Dr. Steven Haefner (Chemistry)**

*Investigations into Novel Dipalladium and Diplatinum Complexes Supported by a Functionalized Formamidine: Towards the Development of New Metal-Organic Frameworks*

The development of metal-organic frameworks (MOFs) has been on the rise in recent years. These are rigid three-dimensional networks of metal complexes linked together by organic molecules. Often such networks are porous allowing small molecules to diffuse inside the material. As such, MOFs show great promise for a variety of potential uses such as in gas storage, separation, and purification, catalysis, chemical filtering, and drug delivery. The goal of this project has been to synthesize a novel organic compound, di-pyrazinylformamidine (HDpyzF), to be used in the formation of such MOFs, as well as analyze its properties and the structures it may form with metals having a square planar geometry. HDpyzF has been synthesized by melting aminopyrazine in triethyl orthoformate under an argon environment providing yields of just over 50%. This has then been reacted with palladium(II) and platinum(II) chlorides using direct addition methods to give bulk products with yields of over 90%. The products of these reactions have been characterized using Nuclear Magnetic Resonance (NMR), Electronic (UV-Vis) spectroscopy, and Infrared (IR) spectroscopy. Efforts are underway to isolate quality single crystals for x-ray diffraction studies. The details of the ligand synthesis and characterization as well as its reactions with palladium(II) and platinum(II) will be presented.

**Poster #22**

**Michelle Mattos, Mentor: Dr. Sam Lone (Chemical Sciences)**

*Characterization of the Lesion Bypass Activity of Rev1 with the Carcinogenic DNA Adduct 1, N-6 Etheno Deoxyadenosine*

Transformation of normal cells to cancer cells is a result of cumulated errors within specific regulatory genes. How DNA obtains errors in these genes has been an area of cancer research that is under intense examination. My research is focused on investigating a special pathway, named translesion DNA synthesis (TLS). TLS is a process by which DNA damage is copied by a novel class of enzymes. Rev1 is a member of these enzymes recruited to bypass certain DNA adducts. The purpose of this project is to measure and quantify Rev1’s ability to perform DNA replication across liver carcinogen 1,N-6 etheno deoxyadenosine (etheno-dA). I have expressed and purified Rev1 to homogeneity using affinity chromatography and size exclusion chromatography. A template-primer in insertion analysis assay was done to determine the ability of Rev1 to replicate DNA that has been modified with etheno-dA. Primer-template analysis reveals that Rev1 incorporates the incorrect nucleotide dCTP across from the etheno-dA lesion. The research will provide molecular details of DNA lesion bypass and will provide a more complete understanding of carcinogenesis.

**Poster #24**

**Steven Oikarinen, Mentor: Dr. Tom Wu (MAHPLS)**

*The Kinematic Analysis of the Kettlebell Swing in Lumbar Spine*

The American kettlebell swing is the preferred swing method for CrossFit workouts and is included in many of the CrossFit workout of the day (WOD) routines. However, research studies have not yet been conducted to evaluate the kettlebell swing technique and its influence on spinal injuries. Therefore, the purpose of this study is to
examine the kinematics of the lumbar spine motion of the American kettlebell swing between two different groups (inexperienced and experienced lifters) with two different loads (16kg and 24kg). Participants from both groups performed five swing repetitions continuously with each load separated by a three-minute rest period to prevent fatigue. Joint reflective markers were placed on the right side of the body at the forehead, chin, shoulder, elbow, wrist, hip, knee, ankle, toe, spine of thoracic 6, lumbar 3, and sacrum 1, top of kettlebell and bottom of kettlebell. A JVC (Model: GR-D371V) video camera operated at 60 Hz with a 650W artificial spotlight was set up to capture the sagittal plane of the swing movement. A standard two-dimension motion analysis was conducted, and video trials were analyzed with Ariel Performance Analysis System (APASTM) software. A total of 100 trials (10 participants x 5 repetitions x 2 loads) were collected in the study, with the analysis focused on the bottom position of the swing. The middle three repetitions (2-4) of each load from each participant were used for data analysis. A two-way (2 groups x 2 loads) mixed model factorial ANOVA design was conducted at α = 0.05 with SPSS (v. 22). Preliminary findings suggest no significant difference between spinal displacement with the 16kg (p=0.718) or 24kg (p=0.699), velocity with the 16kg (=0.783) or the 24kg (p=0.500) and acceleration with the 16kg (p=0.168) or the 24kg (p=0.130) between the two different groups. The small population of subjects and the variability in their skill level limited this study. Future studies should consider a postural analysis to determine each subject’s neutral spine position as a baseline for comparison to their spine position during the swing. Further research is needed to determine the safest spine position for the kettlebell swing.

Poster #26
Brooke Pacheco, Mentor: Dr. Pamela Russell (MAHPLS)
Effects of a Ten-Week Periodized Resistance Training Program on Speed Performance Variables

Strength and speed are important for athletes that repeatedly complete change-of-direction sprinting. With high school pre-seasons limited to summer months, short-term training programs are needed to improve strength and speed. Research findings are inconsistent, but abundant evidence shows periodized resistance training as most beneficial in preparing athletes for season play. The purpose of this study was to investigate the effectiveness of short-term periodized resistance training on speed, and to determine the relationship between relative strength and speed. Eighteen male high school football and soccer players were randomly divided into two groups; nine completed the ten-week, periodized resistance training program (PRTG), and nine served as the control group (CG). All participants were pre and post-tested with the T drill, the Nebraska drill, and a 20-meter dash to assess speed and a three-repetition maximum back squat (3RM), to assess baseline strength. PRTG participants trained three days/week for ten weeks in a supervised structured setting. The CG completed their unsupervised regular preseason training. Five 2x2 ANOVAs (treatment/control vs. pretest/post test), with significance set at .05, were conducted. There was a significant difference for absolute strength (F(1,32) = 52.02, p<.001). The PRTG mean (298.94 lbs ± 58.6 lbs) was greater than the CG mean (186 lbs ± 58.6 lbs). There was also a significant difference for relative strength (i.e., pounds lifted/pounds of body weight) (F(1,32) = 34.9, p<.001). The PRTG mean (1.78 ± 0.31) was greater than the CG mean (1.24 ± 0.24). The training effect on the Nebraska drill approached significance (p = .055) with the PRTG mean (8.26 sec ± 0.46sec) faster than the CG mean (8.56 sec ± 0.63 sec). Relative strength was most highly correlated (-.72) with the Nebraska drill for the PRTG pre-test. Both the PRTG and CG increased absolute and thus relative strength with the training activities. The PRTG improved because the training protocol was designed to develop lower body strength while the CG may have improved because they engaged in sport specific training during the ten-week period. In conclusion, the periodized resistance training protocol did increase strength; but so did the pre-season activities of the CG. The correlation between speed and relative strength was not improved with training. This ten-week, three-day program was not enough to result in significance differences in change-of-direction speed.
Poster #28  
Kevin Roebuck, (Center for Sustainability Grant), Mentor: Dr. Edward Brush (Chemical Sciences)  
**Development of Green Chemistry Metrics and Assessment Plan to Evaluate Research on the Efficiency of Biodiesel Synthesis from Waste Vegetable Oil**  
Biodiesel is an alternative fuel that is made by a simple chemical process that we have found to be highly inefficient and hazardous. Our research is focused on applying green chemistry principles to develop more efficient chemical processes. However, there is currently no reliable set of metrics for assessing the application of green chemistry principles. The goal of this research was to develop and apply green chemistry metrics as part of an assessment plan to evaluate the efficiency of biodiesel synthesis. We reviewed an extensive set of metrics that include green chemistry principles and reaction efficiency indicators, are quantitative and qualitative, and have been integrated into an assessment rubric. The rubric was tested using the traditional biodiesel process, and individual metrics evaluated by changing reaction parameters. The assessment plan will benefit the scientific community as there is currently no generally accepted assessment rubric for evaluating chemical processes to make environmentally conscious decisions. This research was supported by a summer research grant from the BSU Center for Sustainability and Adrian Tinsley Program, and a grant from the EPA P3 program (SU835696).

Poster #30  
Leonard Sprague, (Chemistry-2015 Norris/Richards Summer Research Scholarship from the Northeastern Section of the American Chemical Society), Mentor: Dr. Edward Brush (Chemical Sciences)  
**Applying 1H NMR Spectroscopy to Develop a Kinetic Model for the Transesterification of Glycerol Fatty Acid Triesters**  
Biodiesel produced from vegetable (soybean) oil through a base catalyzed transesterification with methanol is an inefficient process. Our research group is applying green chemistry principles to improve the efficiency of small-scale (bench top) biodiesel production, but this work has been hindered by the lack of detailed information about the mechanism behind the transesterification reaction. Our goal was to develop a detailed kinetic model that would identify whether rate limiting transesterification occurs at C1/3 or C2 as the glyceryl triester is converted into the di- and mono-ester, and finally free glycerol. Transesterification reactions were conducted on a 25mL scale at 60 degrees Celsius to test our methodology for quenching (stopping) the reaction with acetone d-6, and at room temperature to acquire a Time 0 data point. Reaction time points were analyzed using quantitative NMR, employing an internal reference standard of maleic acid for concentration calculations, and integration data was used to analyze and obtain time course data. All controls and standards gave unambiguous NMR spectra with under 5% error. 2D spectroscopy was also investigated and will be assessed for future usefulness in determining C1/3 or C2 ester branches leaving as the limiting step. The results of this research will help narrow the options for improvements to the reaction efficiency, for example in catalyst design. This research was supported by a Norris-Richards Summer Scholarship from the Northeastern Section of the ACS, the BSU Adrian Tinsley Program, and a grant from the EPA P3 program (SU835696).

Poster #32  
Elizabeth Slate, Mentor: Dr. Stephen Waratuke (Chemical Sciences)  
Pericyclic reactions involve electrocyclic additions, sigmatropic rearrangements, and cycloadditions. The Diels Alder reaction is a specific type of cycloaddition in which a 4 pi electron containing diene combines with a 2 pi electron containing dienophile. The product of this reaction is a six membered ring that is derived through a single, concerted step where bond breakage and formation occur at the same time with no intermediates. Modern day chemists utilize the Diels Alder reaction for natural product synthesis due to this clean and predictive six membered ring production. Our first trials have been conducted with two aromatic dienes, furan and 2,5-dimethylfuran at a specific temperature of 80 degrees Celsius, each respectively combined with 3 dienophiles. Percent conversions of each reaction were taken at predetermined time points to shed light of the rate of these Diels Alder reactions as well as endo versus exo product formation ratios.
Poster #34
Femi Stoltz, Mentor: Dr. Melinda Tarsi (Political Science)
2014 in Black & White: A Measure of Policy Attitudes & Structural Conditions of the American Electorate
While discussions of race surrounded the presidential elections of 2008 and 2012, its impact on the 2014 midterm election remains understudied. There was a shift in Congressional power to a Republican Congress and debates about social policies and minority groups’ representation have become salient. Using the Cooperative Congressional Election Study (CCES), I applied a variety of statistical analyses to a national stratified sample of respondents. Investigating political attitudes, policy preferences and structural conditions of the electoral system, I gauged the effects of respondents’ race on these preferences and behavior patterns. This research contributes to literature about race, policy preferences, and the ways in which the two interact within the American political process.

Poster #36
Jasmin Vasconcelos, Mentor: Dr. Laura Boutwell (Social Work)
Transition to Independence: Building Supportive Relationships with Young Adults Aging out of Foster Care
According to Geenen & Powers (2007), youth transition into adulthood from foster care with little to no assistance from support systems, including family. Through in-depth qualitative interviews, this study explores the experiences and insights of young adults, ages 18-25 years old, previously in the care of the Massachusetts Department of Children & Families (DCF). The primary goal of this research is to determine culturally competent practices that build supportive relationships between social workers and youth in foster care and to better equip youth for independence. Data was analyzed using grounded theory and the preliminary data reveals three major themes: relationships with care providers, preparedness for independence, and importance of support systems. Youth in this study stress the importance of lasting relationships as they transition into adulthood, stating it was more important than formal services. Further, they state that they do not feel fully prepared to transition to adulthood, and give recommendations on how social workers can better equip youth aging out of foster care. This study adds to the literature on best practices and hopes to guide social workers in how to best serve young adults aging out of the foster system.

ORAL PRESENTATION SESSION IV  (2:45 pm – 4:00 pm)

Brianna Cataldo, Mentor: Prof. Bruce Machart (English)
People Are Oceans: Narrative Craft, Unreliable Narrators, and the Psychology of Addiction in Young Adult Fiction
The Young Adult (YA) novel draft People Are Oceans will explore how addiction influences the life of a young man and the people around him. As a young man emerging into adulthood, Harrison finds himself facing a devastating event: a car accident that implicates him in the death of his best friend. This trauma forces Harrison to confront his past, one filled with memories of an abusive father. It also forces Harrison to confront the kind of man that he is becoming, one whom he finds easily comparable to his father. All the while, Harrison tries to recover from his physical injuries from the accident. The doctors prescribe Morphine, which Harrison quickly finds does not only cure his physical aches but bury his emotional ones as well. People are Oceans connects YA readers to the harsh realities of addiction and the struggles that come with emerging into adulthood. Additionally, this text explores the relationships between those who suffer from addiction and their loved ones.

William Tringali, Mentor: Dr. Heidi Bean (English)
Kiss Me with Those Red Lips: Queer Monstrosity and the Cultural Rhetoric of the Vampire
The Gothic stands as a genre built upon the anxieties of Victorian London. A cultural landscape of extremely rigid societal niceties, this era of history saw the explosion of an upper-middle class fascination with horror and the uncanny. Employing the notion of the uncanny as the horrible-familiar that is both attractive and repulsive at the same time, the Gothic transgresses binary oppositions. The transgressive nature of the Gothic is in fact what makes it able to present identities that defied normative cultural values, critiquing or commenting on societal
norms within the subtext of their work. One of the most important of these critiques focused around gender. The Victorian era saw greater female independence and the rise of the “New Woman,” causing a wide scare as gender and sexual roles shifted and shook. In the wake of this anxiety arose a new Gothic creature: the vampire. A being of horrific attraction, the vampire was also strangely queer, non-normative, and deeply transgressive. It straddled multiple boundaries—between life and death, attraction and repulsion, and male and female. This project uses the Gothic figure of the vampire to analyze portrayals of queerness in the novels Carmilla and Dracula, discovering how each presents the transgression of Victorian gender and sexual norms. Through the use of queer theory and the critical analysis of these texts, I demonstrate that the queer figure of the vampire served as a way of exploring non-normative gender and sexuality in an era that was marked by anxiety around the shifting roles of women in society.

Caitlin Bradley, Mentor: Dr. John Sexton (English)
*The Hand that Steers 1,000 Ships: The Journey of the Heroine*

The *Hero with a Thousand Faces* by Joseph Campbell proposes that there is one "Journey of the Hero," on which most literary figures embark. This journey can be tracked through most mythology and literature. However, the journeys of the scores of literary women are not often addressed, as they do not always fit the mold of the hero’s journey. Using Maureen Murdock’s *The Heroine’s Journey*, this project examines classic and contemporary fictional heroines to determine what makes a fictional character a hero or an exemplary behavioral model for girls and what it means to be a woman in America today. This examination identifies issues and calls for the future development of stronger literary heroines and the future study of how to encourage girls to be leaders and to compete with men intellectually, politically and professionally. This research project indicates that the terms "male" and "female" are very limiting labels. Women can take the physical "Hero’s Journey" and men can take the emotional "Heroine’s Journey." Characters are individuals, as are real people, and cannot be generalized so broadly. Campbell’s Journey of the Hero is insufficient but not useless. The external and internal journeys should be used in conjunction with one another to adequately evaluate a hero’s growth, regardless of whether the hero is male or female. Additionally, generalizations about gender tend to label real people in unacceptable ways. People who do not fit their gender stereotypes can feel inadequate or may try to change who they are to fit their designated mold. The expectations placed on women today, particularly to have a family and a successful career, pull them in multiple directions simultaneously. They demand that women excel in the traditional "masculine" sphere in addition to being perfect in the traditional womanly roles of mother, daughter and wife. However, only the family aspect is persistently encouraged in literature, though jobs, which are increasingly necessary for young women in America, are not sought by female protagonists. This project assesses the manifestation of these demands and their effects on young female protagonists, and the perpetuation of these stereotypes by literature.

Marie Doyon, Mentor: Dr. Donald Running (Music)
*Setting Poems of Female Writers in the Style of 19th Century Art Songs*

Composers of classical music have traditionally offered limited opportunities for the mezzo-soprano. Composers of vocal scores have primarily chosen to write for the higher female voice (soprano) or the higher male voice (tenor). Furthermore, composers (mostly men) have tended to select texts of famous male poets, such as Goethe, Schiller, and Müller, for song settings. The purpose of this project was to create original Art Songs, for voice, specifically mezzo-soprano, and piano accompaniment. I have set the poems of three female writers—creating a small, and potentially expandable, song cycle. These compositions reflect the moods of the poems and demonstrate the emotional turmoil of a mother anticipating the death of her child, grieving his death, and finally accepting it with expectation to join him in heaven. I started composing by setting the text of the poems to rhythmic values that best match the natural inflection of the words and phrases. The melodies are then written with a flexible harmonic outline in mind. Then I wrote basic accompaniments for the songs and solidified the harmonic structure while integrating both smaller forms (periods, sentences) and larger forms (Rondo, Ternary, etc.) I spent the majority of my time editing what I had already written and nitpicking every aspect of the songs. Currently, I have composed two songs that are performance ready and a working rough draft of the first song in the cycle. I believe my work to
be significant because songs written specifically for the mezzo-soprano voice are not common and there are very few poems written by women actually set to music. I hope that other composers will become more aware of the mezzo-soprano as a medium for art songs and that there is a large, untapped source of poetry written by women that is of high literally quality that composers can utilize.

Aaron Roberts, Mentor: Dr. Jody Weber (Dance)

The Trouble with Masculinity

“If the dialogue between me and my body defines an element of my masculinity, so does the dialogue between my body and other bodies. That dialogue can be created by two discrete bodies – my imagined body and another one that I perceive” – Todd Reeser (2010)

Every instance in which a male dancer steps before an audience, even before he moves, the discourse of masculinity begins. Whether the concern of this discourse his perceived level of masculinity, the levels of masculinity in his movements or the impression of masculinity that is left on an observer, the conversation is unavoidable. The modern discourse concerning masculinity in male dancers can be a limiting factor in the expressive range of dancers and has most certainly been a leading deterrent to the growth of the male population in the dance community. This reality has led me to investigate the effect this limiting discourse of masculinity has had on my own life, both as a gay man of African American descent and as a dancer. Furthermore, the results of this investigation led me to the beginning of a solo work making use of the discursive nature of masculine understanding. To begin this investigation, I studied current writing on masculinity and masculinity in dance; among these works were Masculinity in Theory by Todd Reesner, Men Who Dance by Michael Gard and When Men Dance, a collection of essays on masculinity in the dance community edited by Jennifer Fisher and Anthony Shay. I used these works to build a foundational understanding of the contemporary discourse of masculinity. I then used this understanding to explore the discourse that has shaped my own perception of masculinity. This exploration provided movement material which I then manipulated to create a solo work. This work as performed is a work in progress to be completed in the spring of 2016. My future exploration will involve diving deeper into masculine expression through dance as well as an investigation into society’s expectations of masculine expressions in order convey, challenge or reject these limitations.