2018 Adrian Tinsley Program
Research & Creative Art
Summer Symposium

August 9, 2018
Dana Mohler-Faria Science & Mathematics Center
24 Park Avenue, Bridgewater, MA 02325
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2018 Adrian Tinsley Program
for Undergraduate Research & Creative Scholarship
Summer Symposium

Symposium Program Summary

08.00 - 08.30 am: Continental Breakfast in DMF Science Center Atrium
08.30 - 09.00 am: Welcome – Assistant Provost Dr. Jenny Shanahan
         Opening Remarks – Provost Dr. Karim Ismaili
         Recognition of ATP Summer Researchers and
         Mentors – ATP Coordinator Dr. Thaya
         Paramanathan
09.00 - 10.15 am: Oral Presentations – Session I
         DMF Science Center Auditorium
10.15 - 11.15 am: Poster Presentation – Session I (Odd # Boards)
         DMF Science Center Atrium & Park Avenue Atrium
11.15 - 12.30 pm: Oral Presentations – Session II
         DMF Science Center Auditorium
12.30 - 01.15 pm: Lunch in DMF Science Center Atrium Ground Floor
01.15 - 02.30 pm: Oral Presentations – Session III
         DMF Science Center Auditorium
02.30 - 03.30 pm: Poster Presentation – Session II (Even # Boards)
         DMF Science Center Atrium & Park Avenue Atrium
03.30 - 04.30 pm: Oral Presentations – Session IV
         DMF Science Center Auditorium
04.30 - 04.45 pm: Closing Remarks - Director of Undergraduate
         Research Dr. Jing Tan
         Group Picture – ATP Researchers
04.45 – 05.15 pm: Ice Cream Social in DMF Science Center Atrium
Symposium Presentation Schedule

Oral Presentations – Session I (9.00 am – 10.15 am)
DMF Science Center Auditorium

9.00 am: **Carter Remy**, Mentor: Dr. Diana Fox (Anthropology)
Adapting to College Life: An Ethnographic Study of the Linguistic Challenges Faced by Immigrant Students at Bridgewater State University.

9.12 am: **Kimberly Capri**, Mentor: Dr. Joseph Seggio (Biology)
Connections between Biological Timing and Ethanol Metabolism in Alcohol Dehydrogenase Mutant Fruit Flies.

9.24 am: **Kimberly Tocchio and Brett Sheehan**, Mentor: Dr. Thilina Surasinghe (Biology)
Effective Surveying Methods of Herpetofauna at Tidmarsh Wildlife Sanctuary, Plymouth MA

9.36 am: **James McAvoy**, Mentor: Dr. Jennifer Mendell (Biology)
A Molecular Epidemiological Study of the Prevalence of Tick-Borne Pathogens in Ixodes scapularis Ticks from Plymouth County, Massachusetts

9.48 am: **Laine Drew**, Dr. Lee Torda (English)
An Unquiet Pedagogy for Unquiet Students: Reducing Low Self-Esteem and Anxiety with Critical Pedagogy

10.00 am: **Margaret Keefe**, Mentor: Dr. Lee Torda (English)
It’s Kind of a Curious Incident in the Bell Jar, Franny: Using Literature and Discussion to Advocate for Mental Health Education in the High School English Classroom

Poster Presentations – Session I (10.15 am – 11.15 am)
DMF Science Center Atrium (1st Floor) & Park Avenue Atrium (2nd Floor)

Board-1: **Emma Johansen-Hewitt**, Mentor: Prof. Amy Lovera (Art)
54 Years at 33 Belleview
Board-3: Jill Lengel, Mentor: Dr. Sean H. McPherson (Art History)
Bauhaus-ian Rhapsody, Uncle Chester Went to Cambridge: An Adventure with Walter Gropius and The Architects Collaborative

Board-5: Cady A. Parker, Mentor: Dr. Jeanne Ingle (Elementary Education)
The TAB Choice - Teaching for Artistic Behavior: Student Learning in a Choice-Based Art Classroom

Board-7: Cara Daybré, Mentor: Dr. Tom Wu (Movement Arts, Health Promotion & Leisure Studies)
Kinetic Analysis of Landing a Grand Jeté between Barefoot and Pointe Shoes Footwear for Dominant and Non-Dominant Legs

Board-9: Cayla Marks, Mentor: Dr. Lee Torda (English)
Do You Seriously Believe This?: #fakenews Meets Literacy in the Language Arts Classroom

Board-11: Sara Gottfried, Mentor: Dr. Denise Howley (Social Work)
Exploring Educators’ Perceptions of Students’ Academic Skills, Behavior, and Well-Being

Board-13: Mia Sarkisian, Mentor: Dr. Ellen Ingmanson (Anthropology)
Mother-Infant Interactions: The Staple of Orangutan Learning

Board-15: Sabrina Jefferson, Mentor: Dr. Ashley Hansen-Brown (Psychology)
Psychological and Demographic Differences in the BDSM Population

Board-17: Caitlin Rowley, Mentor: Dr. Melinda Tarsi (Political Science)
Unvarnished Inhumanity: America’s Farm Industry

Board-19: Elena Babicz, Mentor: Dr. M. Caitlin Fisher-Reid (Biology)
SPARCnet Year 1.5: Preliminary Results of a Long Term Mark-Recapture Study on Plethodon cinereus in Bridgewater, MA

Board-21: Erica Hess, Mentors: Dr. Saritha Nellutla and Dr. Steven Haefner (Chemistry)
Theoretical Investigations into the Magnetism of Oxo-centered Tri-metallic Clusters Decorated with Nitroxide Groups.
Board-23: Eli Schwartz, Mentor: Dr. Steven Haefner (Chemistry)
*Synthesis of Novel Re\textsuperscript{III} and Re\textsuperscript{V} Metallointercalator Complexes for use as DNA Damage Probes*

Board-25: Ashley Berube, Mentor: Dr. Edward J. Brush (Chemistry)
*Preliminary investigation of the qualitative and quantitative exposure of a community of college students to Bisphenol A*

Board-27: Michaela Deady, Mentor: Dr. Shannon Lockard (Mathematics)
*The Pattern Doesn’t Fall Far from the Tree: Exploring Patterns of the Calkin-Wilf 3-ary Tree.*

**Oral Presentations – Session II (11.15 am – 12.30 pm)**
DMF Science Center Auditorium

11.15 am  **Margaret Elizabeth Vacher-Weill**, Mentor: Dr. Jennifer Mead (Movement Arts, Health Promotion & Leisure Studies)
*Transitioning Out of Sport: Athletic Identity and the Experience of Career Termination in Elite Soccer Players*

11.27 am:  **Brett Franzie**, Dr. Inkyoung Kim (Political Science)
*Sovereignty Before Rights: Human Rights Universalization in International Law*

11.39 am:  **Vanessa Sherman**, Mentor: Dr. Jordon Barkalow (Political Science)
*Testing Tocqueville: The Political Theory of the “Mayflower Compact” and Its Legacy*

11.51 am:  **Theresa Aldrich**, Mentor: Dr. Margaret Boyd (Social Work)
*A case study of a therapeutic farm community with ethnographic methods*

12.03 pm:  **Sadye Pavao**, Mentor: Dr. Edward Carter (Special Education)
*What Do I Do When They Won’t Stop Moving?*

12.15 pm:  **Kaitlyn Peterson**, Mentor: Dr. Edward Carter (Special Education)
*Investigating Decision-Making Models for Multi-Tiered Reading Interventions for Struggling Readers*
Oral Presentations – Session III (1.15 pm – 2.30 pm)
DMF Science Center Auditorium

1.15 pm: **Matthew Gregory Scott**, Mentor: Dr. Heidi Bean (English)
*American Life after the Apocalypse: Anxieties About the Politicization of Media in Young Adult Dystopias*

1.27 pm: **Genesis Galan**, Mentor: Dr. Kimberly Davis (English)
*The Construction of Identity in African American Male Adolescents*

1.39 pm: **Janene Johnson**, Mentor: Dr. Ann Brunjes (English)
*Re-visionsing Womanhood: Realism in Catharine Maria Sedgwick’s Nineteenth-Century Novels*

1.51 pm: **Elizabeth Tobin**, Mentor: Dr. Kimberly Davis (English)
*Mental Illness and Psychological Conditions in 19th and Early 20th Century American Literature*

2.03 pm: **Brian Dolle** and **Zachary Ells**, Mentor: Dr. Thaya Paramanathan (Physics)
*Quantifying Anticancer Drug Doxorubicin Binding to DNA Using Optical Tweezers*

2.15 pm: **Adam Jabak**, Mentor: Dr. Thaya Paramanathan (Physics)
*Exploring how Chirality Affects the DNA Binding Properties of Threading Ruthenium Complexes Using Optical Tweezers*

Poster Presentations – Session II (2.30 pm – 3.30 pm)
DMF Science Center Atrium (1st Floor) & Park Avenue Atrium (2nd Floor)

**Board-2:** **Karly Foster**, Mentor: Prof. Miranda Giurleo (Theater)
*A Study in Late Victorian Women’s Garment Construction for the Stage*

**Board-4:** **Samantha Cushman**, Mentor: Prof. Leigh Craven (Art)
*Exposing My Insanity: An Exploration of Mental Illness*

**Board-6:** **Cameron Lee Covert**, Mentor: Dr. Daniel Lomba (Economics)
*Influences of Gasoline Price Fluctuations on Consumer and Fleet Transportation Preference*
Board-8: Abigail Bailey, Mentor: Dr. Tom Wu
(Movement Arts, Health Promotion & Leisure Studies)
An Examination of the Effects of Aquatic Activities on the Motor Skills of Autistic Children

Board-10: Sarah Hamel, Mentor: Dr. Karen Aicher (Communication Sciences and Disorders)
The Effects of Sports Participation on Working Memory in Young Adults

Board-12: Julie Rebecca Clerge, Mentor: Dr. Wendy Champagnie Williams (Social Work)
“I Belong Here”: An Investigation into the Key Factors that Foster Self-Efficacy in Academically Successful Minority Students

Board-14: Allison S. Bernique, Mentor: Dr. Elizabeth R. Spievak (Psychology)
Lights, Camera, Anxiety: The Spotlight Effect, Social Anxiety and the Perception of Gaze Direction

Board-16: Ingrid Hasselquist, Mentor: Dr. Teresa King (Psychology)
The Significance of Training and Education: An Analysis of Attitudes Surrounding Narcan at Bridgewater State University

Board-18: John L’Heureux, Mentor: Prof. Jamie Kern (Physics)
Ensemble Photometry of Exoplanets at the BSU Observatory: Improving Previous Measurements and Streamlining New Ones

Board-20: Mathew Driscoll and Alexis Correira, Mentor: Dr. Christopher Bloch (Biology)
Effects of Latitude and Prey Abundance on the Reproductive Output of the Asian Shore Crab

Board-22: Emma Perry, Mentor: Dr. Ed Brush (Chemistry)
An Investigation of Human Glyoxalase I Inhibition by a Glutathione-Methyleneoxindole Conjugate as a Means of Anti-Cancer Therapeutics
Board-24: Christian Santos, Mentor: Dr. Sarah Soltau (Chemistry)
An Investigation to Locate the Binding Site and Mode of Electron Transfer between Two Proteins, KshA and KshB.

Board-26: Neha Kharidi, Mentor: Dr. Michael Black (Computer Science)
Educating Middle-School Children in Digital Design

Board-28: Zenan Sun, Mentor: Dr. Kevin Rion (Mathematics)
How Do Solar Panels Substitute for Total Electricity Generation in the US?

Oral Presentations – Session IV (3.30 pm – 4.30 pm)
DMF Science Center Auditorium

3.30 pm: Samantha Correia, Mentor: Dr. Joyce Rain Anderson (English)
Searching for Identity: Connecting Students to Young Adult Literature in the Classroom through Language

3.42 pm: Dawna Vella, Mentors: Dr. Joyce Rain Anderson (English) and Dr. Joseph Schwab (Psychology)
Identity Exploration through Content-Based Creative Writing with Native American Adolescents

3.54 pm: Benjamin Kaliff, Mentor: Dr. Thomas Nester (History)
Are Your People Mad? George Washington, Rebellions, and the Fulfillment of Political Ideology

4.06 pm: Olivia Englehart, Mentor: Dr. Sean McPherson (Art History)
Representing Absence: Substance and Essence in Zen Buddhist Art

4.18 pm: Daniel Moriarty, Mentor: Dr. Ryan LaBrozzi (Sustainability)
How Converging Internet and Green Technologies can Stimulate a Collaborative Agricultural Revolution in the Face of Climate Change

4.30 pm: Group Picture of ATP Researchers
Carter Remy  Mentor: Dr. Diana Fox (Anthropology)

*Adapting to College Life: An Ethnographic Study of the Linguistic Challenges Faced by Immigrant Students at Bridgewater State University.*

Four out of five students in this study indicate satisfaction with their language proficiency in spite of significant struggles. My research indicates that a gap exists between how well versed they are in peer and community speech communities vs. in English language writing and speaking skills in the classroom. Data show that these language difficulties persist because of a lack of support coming from services aimed at the demographic group under study. Bridgewater State University prides itself in the success of its students; however, interviews and observations with faculty, Administrators, and black, male, immigrant students indicate that preparing English Language Learners (ELL) for success has not been a focus. This study draws on a multitiered methodology beginning with an autoethnographic work (self-analysis of this researcher’s own experiences), rapport-building, ethnographic and qualitative data from open-ended and formal interviews, and naturalistic observations of speech communities. The methodology has generated insights into the domestic immigrant student population via the perspectives of students, faculty from the Global Languages and English Departments, and administrators. It examined the linguistic readiness of black male immigrants who have completed their first year at BSU as well as how the resources the university offers, and students’ use of those resources, impact their language skills. Selected by purposive sampling, the resulting case studies offer an emic perception of the students’ linguistic readiness validating James Cummins’ threshold hypothesis (1979) which proposes that following the levels of language acquisition, there are also levels of linguistic readiness necessary to achieve academic language proficiency.
Kimberly Capri, Mentor: Dr. Joseph Seggio (Biological Sciences)  
*Connections between Biological Timing and Ethanol Metabolism in Alcohol Dehydrogenase Mutant Fruit Flies.*

Alcohol is a commonly used drug that can cause behavioral and physiological disorders. Alcohol is metabolized through the body due to an enzyme called Alcohol Dehydrogenase (ADH). ADH plays a big role in ethanol metabolism and possibly biological timing. Due to the *Drosophila melanogaster* physiological similarities to humans, they were used to test the tolerance and sensitivity with ADH mutant flies. The research goal was to determine whether ADH affects the metabolism of ethanol differently depending on the time of day consumed. Ethanol sedation and recovery trials were used at two different time points to determine these results. Overall, we saw that ADH 4062 (positive) was the most tolerant of all the strains. ADH 3976 (null) and both the ADH positive mutants (ADH 4062 and 6040) did not show day-night variation in sensitivity trials. ADH 3976 (null) mutant overall motor control recovery in tolerance was significantly longer regardless of circadian rhythm. Like previous papers, the wildtype Or-R, did show a day-night variation in sensitivity. We found that all ADH mutants (excluding the null mutants) exhibited tolerance by experiencing slower alcohol-induced sedation and quicker alcohol-induced recovery during the second day. Unlike wild-type strains of flies, the ADH *Drosophila* mutants did not exhibit sex-specific differences in alcohol sensitivity or tolerance. These studies provide important data on how the circadian clock effects alcohol-induced behaviors and how the time of day can play a role in ethanol metabolism.

Kimberly Tocchio and Brett Sheehan, Mentor: Dr. Thilina Surasinghe (Biological Sciences)  
*Effective Surveying Methods of Herpetofauna at Tidmarsh Wildlife Sanctuary, Plymouth MA*

From 2011-2015, Tidmarsh Wildlife Sanctuary underwent the largest ecological restoration process in the northeast in order to convert 480 of
the 600 acre cranberry bog into a variety of wetland habitats. Restoration included removing dams, restoring streams, and creating wetlands. The sanctuary now consists of woodlands, wetlands, ponds, streams and several native plant species. After the large scale restoration was complete, the land was sold to Mass Audubon Society, and it was made a public wildlife sanctuary in 2017. Since then, a variety of different collaborative research started there for education and conservation. During the summer of 2018 we worked under Dr. Surasinghe to use different survey techniques to create a species inventory of reptiles and amphibians at the property for Mass Audubon. Reptiles and amphibians, or herpetofauna, were not yet studied at the property in terms of species abundance, which is important as herpetofauna are indicator species - if a greater number of species are present, it means that the environment is thriving after restoration. A variety of traps were used including funnel traps, hoop traps, and crab traps in addition to weekly visual encounter surveys in hopes of catching or finding different species of snakes, toads, frogs and turtles. Baited traps were deployed once a week, checked daily, and returned on Fridays. Once an individual was captured, it was recorded and set free. A variety of turtles, toads, fish and snakes have been recorded thus far, and our research will continue into the fall.

James McAvoy, Mentor: Dr. Jennifer Mendell (Biological Sciences)

A Molecular Epidemiological Study of the Prevalence of Tick-Borne Pathogens in Ixodes scapularis Ticks from Plymouth County, Massachusetts

An increase in the incidence of tick-borne borne diseases within the Commonwealth of Massachusetts has resulted in the need to better understand the epidemiology of these pathogens in their tick hosts. A critical first step in elucidating the prevalence of theses pathogens in a certain area is the ability to accurately and rapidly identify these pathogens in their arthropod hosts. The goal of this study is to develop a polymerase chain reaction (PCR) assay specific for the spirochete bacterium Borrelia burgdorferi, causative agent of Lyme disease, in Ixodes scapularis ticks collected across Plymouth County. Five PCR primer
sets targeting various \textit{B. burgdorferi} genes (16S rDNA, flagellin, p66, ospA, and the 5S-23S ITS region) were tested against extracted DNA from ten characterized bacterial species to examine potential cross-reactivity. As the total extracted DNA from a tick would include DNA from numerous microbial genera, ensuring limited cross-reactivity is essential in avoiding false positive PCR amplification. All reactions utilized a nested PCR approach to further ensure specificity. The resultant PCR amplicons were subjected to agarose gel electrophoresis, with observed bands qualitatively compared to reported amplicon sizes for each primer set. Of the five primer sets, 16S rDNA, ospA, and flagellin primers proved to be specific for \textit{B. burgdorferi}, while the 5S-23S ITS and p66 primers proved to be less specific, resulting in amplification of the characterized bacterial DNA. The specific primer sets were then used for screening ticks for the presence of the Lyme disease causing pathogen, \textit{B. burgdorferi}.

**Laine Drew, Dr. Lee Torda (English)**

\textit{An Unquiet Pedagogy for Unquiet Students: Reducing Low Self-Esteem and Anxiety with Critical Pedagogy}

This presentation considers the possibility for critical pedagogy in the literacy classroom, with its focus on empowering learners to interrogate texts of all kinds, to support students who struggle with anxiety to be successful, in and out of the classroom, as thinkers and citizens. The U.S has a history of inequality in education, functioning as it often does, hierarchically, that creates classrooms that disempower students, removing them from agency in their own education. Among the many reasons students struggle with anxiety, both those students who are clinically diagnosed as well as students who experience, at various times, less easily defined anxiety, one such reason is a sense of powerlessness over circumstance, including their ability to succeed academically. Learned helplessness towards academic success further compounds these feelings of powerlessness. Critical pedagogy as outlined by the educators Paulo Freire and bell hooks, attempts to reposition power in the classroom from the teacher to the students through praxis, which requires rigorous interaction with and interrogation of texts broadly
defined. I want to argue that it is important to recognize that educational inequalities and hierarchies contribute to anxiety and suggest how critical pedagogy (rigorous and critical interrogation of texts and ideas by readers, a community of learners working together to make meaning, and a commitment to action in the world) can reduce anxiety in the school setting, in particular, and set students up for academic success that creates powerful, active learners in and out of the classroom.

**Margaret Keefe**, Mentor: Dr. Lee Torda (English)

*It’s Kind of a Curious Incident in the Bell Jar, Franny: Using Literature and Discussion to Advocate for Mental Health Education in the High School English Classroom*

This project identifies how reading texts that discuss mental disorders can develop narrative empathy among high school students, and increase awareness and reduce stigma. Given the high rate of mental disorders among young adults (approximately 14 and 20 percent, according to the National Research Council and Institute of Medicine), secondary education has the unique and important opportunity to address the mental health of high school students. Nonetheless, teachers and administrators often feel overwhelmed and ill-equipped to handle these issues in their schools and classrooms. However, often ignored is how literature can be harnessed to introduce mental health awareness to students. According to Suzanne Keen, literature engenders empathy among readers—a phenomenon referred to as narrative empathy. Therefore, language arts classrooms provide students with the ability to access and critically analyze texts as an outlet for expression and understanding of a range of issues, including mental health. Furthermore, the popularity of novels such as Thirteen Reasons Why, which has been criticized by mental health professionals as graphic and triggering, underscores the importance of proper text selection. Thus, texts already used in the classroom, such as Sylvia Plath’s *The Bell Jar* and J.D. Salinger’s *The Catcher in the Rye*, which depict mental disorders in a responsible manner, can be better utilized to start a conversation on mental health. The goal of this research is to identify texts and ways to teach them so as
to introduce educators to how literature can start important conversations around student mental health.

**Poster Presentations – Session I**

**Board-1**

**Emma Johansen-Hewitt**, Mentor: Prof. Amy Lovera (Art & Art History)

*54 Years at 33 Belleview*

My great grandmother has lived at 33 Belleview Avenue for the past 54 years. The house was built for her and my great grandfather, and she oversaw every detail of the house being built. Recently, my great grandmother decided the time had come for her to move into an assisted living facility. I spent a lot of time this summer helping her prepare for that move both physically and emotionally, sitting in the living room on Friday afternoons going through family photographs or old knickknacks, listening to the stories of each one. As she told the stories, she would often forget a detail, like the name of the person who gave her the music box, or where a photograph was taken. Not remembering the details bothered her, but she would always eventually remember. This body of work explores memory, as well as the failures of memory. What do we keep with us, and why do we keep it? What do we document and catalog throughout our lives? Items and photographs we collect throughout our lives often become a record of the life we have lived, tangible evidence of our experiences. In this work, I express the ideas of memory using three different photographic techniques: anthotypes, cyanotypes, and digital pigment ink transfer on aluminum. Through a combination of historic family photographs and contemporary photographs, I tell the story of my great grandmother’s experience, and reflect more broadly on what makes a life, and how we remember our lives.
Modernism was more than a style; it was a Cause. Walter Gropius wrote his manifesto for the Bauhaus in 1919 as a call for artists and architects to work together in collaboration and creativity. “Such an approach could only have been the distillate of a richly textured, multi-colored tapestry of history.” Of all the connecting threads, one stands out the most, Chester Nagel. In 1949 he wrote, “We who have been Gropius’ students can say gratefully that he has shown us a place in society... that he has explained to us the possibilities and values of communal action.” I was intrigued after finding such remarkable praise of an icon of the twentieth-century written by a man I am proud to call Uncle. Chester Nagel left behind a partially told story about Walter Gropius, the “Man of Vision.” This project has given me a better understanding of my Texas German-American Heritage and the Modern style of architecture. It is also a unique story compared to many of the books, stories and biographies written about Walter Gropius.

Traditional methods of art instruction are not successful in producing students who can think critically and in original, innovative ways (Kim, 2011). “The carefully managed step-by-step traditional art school experience leaves little in student control [and the] results conform to an adult aesthetic” (Douglas, 2018, p.14). TAB-Choice (Teacher for Artistic Behavior in a Choice-Based Setting) is a student-led art curriculum that focuses on the development of a student’s individual creativity. Rather than explicit instruction, it shifts creative control of learning from teacher
The purpose of this qualitative research study was to determine what art teachers perceive to be the major benefits to students in a TAB-Choice classroom. Participants were identified through a posting on social media, through a Facebook group named Teaching for Artistic Behavior (TAB) Art Educators. The researcher posted an invitation to participate in the study, calling for teachers specifically in the Massachusetts area. After sending additional information about the project, four participants volunteered for the study. Through the use of interview, observation, and collection of artifacts, the researcher was able to identify three emergent themes in response to the study question, “What do art teachers perceive to be the major benefits to students in a TAB-Choice classroom?” Those themes were: TAB-Choice allows students to be more creative, TAB-Choice increases student engagement, and the process utilized in a TAB-Choice classroom develops skills that can used in all areas of life. The major limitation of this study was the small number of participants. Future research should include a larger participant group.

Board-7
Cara Daybré, Mentor: Dr. Tom Wu
(Movement Arts, Health Promotion & Leisure Studies)
Kinetic Analysis of Landing a Grand Jeté between Barefoot and Pointe Shoes Footwear for Dominant and Non-Dominant Legs

Dancers wear pointe shoes while performing Grand Jeté because they produce an illusion that the dancers are floating. Since dancers are required to absorb a significant amount of force in a small area on the toes during landing, this then causes a high incidence of injury. The question of how to perform Grand Jeté safely for both feet remained unaddressed. Therefore, the purpose of this study was to examine the ground reaction force in the skill of Grand Jeté between barefoot and pointe shoes for both dominant and non-dominant legs. Seven female experienced dancers performed a Grand Jeté and jumped and landed on top of a force plate barefoot and with pointe shoes for both dominant and non-dominant legs. The results showed that there is no significant
difference between the landing legs or footwear conditions. Only slightly off from being statistically significant, a difference in landing force between the dominant and non-dominant legs was observed. The dominant leg’s landing force was lower than the non-dominant force, suggesting that dancers may be better able to dissipate landing forces when landing on their dominant leg. This study provides a preliminary comprehensive understanding on the mechanics of performing a Grand Jeté; practitioners may utilize this information for teaching instruction and to prescribe a proper strength and conditioning program to reduce the risk of injury. Future studies are warranted to examine novice dancers to determine if lack of training may result in a statistically significant difference in landing forces between the examined conditions.

**Board-9**

**Cayla Marks**, Mentor: Dr. Lee Torda (English)

*Do You Seriously Believe This?: #fakenews Meets Literacy in the Language Arts Classroom*

This poster reflects an analysis of 126 instances of “#fakenews” on Twitter and coded for differences in meaning and intention among authors to identify a continuum of definitions for the hashtag. Using TweetReach, a program designed to track virality, I assessed reach—or how often #fakenews appeared during a given time period. Then, using MaxQda analysis software, I coded individual tweets to categorize and analyze for nuances in meaning and use. Coding indicated that #fakenews is used as a kind of shorthand to signify a wide range of ideas, ranging from actually identifying information that is false to simply indicate support for a political figure or idea. Subsequent review of the literature supported my analysis, and suggested that while #fakenews presents significant challenges to developing literacy among students due to sheer volume, strategies that language arts teachers and librarians have employed to teach information literacy remain a valid defense against the destabilizing effects of #fakenews on comprehension and belief.
Board-11
Sara Gottfried, Mentor: Dr. Denise Howley (Social Work)

*Exploring Educators’ Perceptions of Students’ Academic Skills, Behavior, and Well-Being*

Research indicates that academic performance and social and emotional well-being are fundamentally interrelated (Schonert-Reichl, Oberle, Lawlor, Abbott, Thomson, Oberlander, & Diamond, 2015). Given that 13-20% of children in the United States experience one or more mental disorders, schools are forced to attend to the social, emotional, and behavioral needs of students (Maynard, Solis, Miller, & Brendel, 2017). However, students are often unequipped with the skills to effectively cope with stress resort to behaviors that cause emotional, mental, and physical suffering, all of which thwart the learning process (Schonert-Reichl et al., 2015). Schools warrant interventions that support the whole student, given the increase in standardized testing and mental health statistics, (Meiklejohn, Phillips, Freedman, Griffin, Biegel, Roach, Frank, Burke, Pinger, Soloway, Isberg, Sibinga, Grossman, & Saltzman, 2012). Many schools have integrated mindfulness practices within classrooms. This study sought to understand the efficacy of mindfulness programs in the K-12 education setting, specifically educators’ perceptions of mindfulness on students’ academic skills, behavior, and well-being. This qualitative study involved semi-structured interviews with ten participants across Massachusetts and Rhode Island. Findings indicate that mindfulness is successful when applied both indirectly and directly, is adaptable within class structures and transitional periods, is practiced using a variety of techniques, and supports a diverse student climate. However, there was few data that supported the effects of mindfulness on academics. This study suggests that mindfulness is an effective means to supporting students’ behavior and well-being, however further research measuring the effects of mindfulness on academic skills is needed.
Orangutan conservation efforts sometimes require that rescued orphaned infants are raised by human caretakers. It is essential to know as much as possible about how orangutan mothers raise their infants in the wild in order to ensure that rescued infants can someday be returned to the forest. However, with the difficulties of observational research in their natural habitats in Borneo and Sumatra, little is still known about infant-rearing behavior. Thus, researchers often look to captive orangutan mother-infant relations for greater understanding. My research focused on two-year old infant orangutan (*Pongo pygmaeus*) Redd and his mother Batang, located at the Smithsonian National Zoo in Washington, D.C. Two areas of behavior were highlighted for observation: Redd’s daily activities and control in the mother-infant relationship. While as a two-year old, Redd is very active playing and exploring, we see how much his daily activities are still influenced and controlled by his mother, Batang. Redd’s behavior and the relationship he has with his mother at this age, will shape his behavior throughout his entire life.

This study focused on the bondage/discipline, dominance/submission, sadism/masochism (BDSM) community. These individuals are widely understudied in the field of psychology; therefore, the purpose of this study was to gain more general knowledge about the population along with specific information about narcissism, anxiety, depression, sensation-seeking, self-esteem, social anxiety, and sexual narcissism. Differences between self-identified BDSM sub groups were explored during this study with the goal of doing future comparisons between BDSM practitioners and the general population. The general lack of
knowledge about this group can be contributed to how few studies have been performed. It was found in a 2014 study done by Faccio, Casini, & Cipolletta, that 50% of psychotherapists questioned did not know if practitioners were psychologically healthy. During the ATP Symposium, demographic information from the BDSM population will be presented. This information was gathered at two BDSM lifestyle events located in Maryland and New Jersey by using questionnaires that attendees voluntarily filled out. In the fall, an Mturk sample of the general population will be collected with the goal of comparing the BDSM practitioner sample against the general population sample.

Board-17

Caitlin Rowley, Mentor: Dr. Melinda Tarsi (Political Science)

Unvarnished Inhumanity: America’s Farm Industry

As exposed through a variance of media outlets, the United States has consistently displayed gross negligence with regard to its implementation of farm animal welfare policies; though the federal government does exhibit modest regulations, the limited scope and lax enforcement of these provisions have allowed the maltreatment of farm animals to persist. Consequently, over the course of the past decade, state governments have been taking initiative in crafting policy designed to alleviate the suffering of animals raised for slaughter. While these are progressive strides, they are nonetheless few and far between, thus highlighting the lack of cohesion within this realm of policy. This portion of my research was accordingly designed to gauge the extent to which policy reflects public opinion, as dissatisfaction within a particular domain often acts as a precursor to a shift in legislation. With this, I launched an original survey through Amazon’s Mechanical Turk program and collected data from 347 Massachusetts residents reflecting their views on issues such as statutory protections for farm animals, concern over the economic impacts of heightened regulations, and the roles of both state and federal governments in implementing such measures. As my results revealed overwhelming support for legislative action, my future research will include placing farm animal welfare policy within the
context of political scientist John Kingdon’s Three Streams Model, and I will thereon assess whether the United States should anticipate the opening of a “window of opportunity” and, subsequently, legislative action at the federal level.

Board-19
Elena Babicz, Mentor: Dr. M. Caitlin Fisher-Reid (Biological Sciences)
SPARCnet Year 1.5: Preliminary Results of a Long Term Mark-Recapture Study on Plethodon cinereus in Bridgewater, MA

The Salamander Population Adaptation Research Collaboration Network (SPARCnet) is a collaborative network of researchers throughout northeastern North America who are studying regional variation and responses to climate change and land use on populations of the eastern red-backed salamander (Plethodon cinereus). In 2016, we established three pairs of SPARCnet plots, each with 50 standardized artificial cover objects (untreated pine) in Great Hill Forest, Bridgewater, MA. Plots are visited weekly, six times each in the fall and spring, and all salamanders are marked with a unique color code of visual implant elastomer. Additionally, snout-vent length, total length, sex and reproductive status, and color morph are all recorded. After three sampling seasons, we have marked 392 individual salamanders, and have recapture rates that average 42% per season. Salamander density between plots is highly variable, ranging from 0.18–2.76 salamanders/m², but fairly consistent within a plot between seasons. In 2017, we established two new experimental plots. These plots follow SPARCnet protocols but are not contributing data to the core SPARCnet projects, therefore we can carry out experimental manipulations which may impact salamander abundance (e.g., adjusting shade cover). We are sampling these new plots weekly and continuously from April through November. This poster summarizes our SPARCnet data collected thus far and compares the new experimental plots to the original six plots in terms of salamander abundance, canopy cover, and soil composition. We are continuing to collect baseline abundance data in the experimental plots through Fall 2018 and begin shade treatments in Spring 2019.
Borad-21

Erica Hess, Mentors: Dr. Saritha Nellutla and Dr. Steven Haefner (Chemical Sciences)

*Theoretical Investigations into the Magnetism of Oxo-centered Trimetallic Clusters Decorated with Nitroxide Groups.*

Since it has been discovered that a single molecule has the potential to store data, researchers have been designing and synthesizing new magnetic materials with the hopes of finding a material that can serve as a single molecule magnet (SMM). One of the main factors that influences SMM’s magnetic properties is their structure, and so it is important to understand the correlation between structure and magnetic properties. Therefore, the goal of this project is to computationally evaluate the magnetic properties of three novel trimetric transition metal clusters decorated with nitroxide radicals, namely $[\text{Ru}_3\text{O(O}_2\text{CH)}_6\text{(ON(CH}_3\text{)}_2)_3]^+$, $[\text{Cr}_3\text{O(O}_2\text{CH)}_6\text{(ON(CH}_3\text{)}_2)_3]^+$, and $[\text{Fe}_3\text{O(O}_2\text{CH)}_6\text{(ON(CH}_3\text{)}_2)_3]^+$. Presently, this correlation is being evaluated in a $[\text{Cr}_3(\mu_3\text{-O})(\mu_2\text{-PhCOO})_6(\text{H}_2\text{O})_3]^+$ (Cr$_3$O) cluster, reported by Figuerola et. al. (Inorg. Chem. 2007, 46, 11017), whose structure is similar to that of the proposed clusters. Specifically, density functional theory calculations on Cr$_3$O cluster using Gaussian 09 software are currently underway to fine-tune the balance between accuracy of data versus computational expense, which is of utmost importance in computational work. This presentation will detail some of the preliminary findings obtained so far on Cr$_3$O cluster.

Board-23

Eli Schwartz, Mentor: Dr. Steven Haefner (Chemical Sciences)

*Synthesis of Novel Re$^{II}$ and Re$^{V}$ Metallointercalator Complexes for use as DNA Damage Probes*

Cancer is a disease that affects millions around the globe. Treatments such as radiation and chemotherapy are often used to treat cancerous tumors, but are not 100% effective in curing the patient. Alternatively, some research groups have proposed the use of metallointercalators, metal complexes with the ability to directly bind to DNA through
intercalation between the stacks of DNA base pairs. These complexes could potentially be used as a probe to analyze and identify chemically damaged DNA. The ultimate goal would be to design molecules that could detect damaged DNA at the molecular level and allow treatment before tumors could develop. Our objective is to design and synthesize novel metallointercalator complexes of rhenium, and to examine their physical and spectroscopic properties. Specifically, we are attempting to prepare \([\text{Re(Py}_2\text{NO)}dppz]^{3+}\) and \([\text{ReO(dpk-OEt)dppz]}^{2+}\) (\(\text{Py}_2\text{NO} = 4,4\text{-dimethyl-2,2-di(2-pyridyl)oxazolidine; dpk-OEt = (py)}_2\text{C(O)}\text{OCH}_2\text{CH}_3; \text{dppz = dipyridophenazine). To date, there has been one report of a Re}^{\text{I}}\) metallointercalator, and no reports of Re\(^{\text{III}}\) or Re\(^{\text{V}}\) based intercalators. Reaction of TBA\(_2\)[Re\(_2\text{Cl}_8\)] with two equivalents of \(\text{Py}_2\text{NO}\) in acetonitrile produces a dark brown compound believed to be the intermediate \(\text{Re(Py}_2\text{NO)}\text{Cl}_3\). When the reaction is performed in ethanol, however, the Re\(^{\text{V}}\) oxo complex \(\text{ReO(dpk-OEt)}\text{Cl}_2\) was isolated. This complex can be prepared by direct reaction of TBA\(_2\)[Re\(_2\text{Cl}_8\)] and di-2-pyridyl ketone (dpk) in ethanol (~70% yield). Reaction of \(\text{ReO(dpk-OEt)}\text{Cl}_2\) with two equivalents of \(\text{Ag}^+\) in acetonitrile, followed by the addition of dppz produces a reddish brown product thought to be \([\text{ReO(dpk-OEt)}dppz]\)\(^{2+}\). Details of the synthesis and characterization of these compounds are presented.

Board-25
Ashley Berube, Mentor: Dr. Edward J. Brush (Chemical Sciences)

Preliminary Investigation of the Qualitative and Quantitative Exposure of a Community of College Students to Bisphenol A

Chemical products have had a positive impact on society, however, there have also been unintended consequences on human health and the environment. College students come in contact with chemicals every day, but through what routes of exposure, and having what impacts on student success? The long-term goal of my research is to determine the extent to which a community of college students are exposed to chemicals in their everyday lives. I am investigating the use of a silicone-ring personal monitoring device that can be worn by a student, then
extracted and analyzed for chemical exposure by gas chromatography with flame ionization detection (GC-FID). I have developed and accessed methodology to expose silicone rings and wristbands to solutions of Bisphenol A (BPA), solvent extraction with ethyl acetate, and quantitative analysis by GC-FID. BPA was chosen as a test compound due to its widespread use in commercial products, and it is a well-known endocrine disrupting chemical. I have tested this methodology by extracting and analyzing thermal receipt paper and carbonless copy paper for BPA. Our preliminary results suggest that we can use silicone rings to adsorb BPA, and GC-FID to detect BPA at parts-per-million (ppm) concentrations. These results have launched a broader investigation to discover other types of chemical exposure, the impact on student success, and how we can work together to educate and inform the college community. This research is supported by the BSU Department of Chemistry and a summer grant from the Adrian Tinsley Program for Undergraduate Research.

Board-27
Michaela Deady, Mentor: Dr. Shannon Lockard (Mathematics)

The Pattern Doesn’t Fall Far from the Tree: Exploring Patterns of the Calkin-Wilf 3-ary Tree.

The Calkin-Wilf tree was introduced as a method of counting the set of positive fractions, giving a new way to prove a well-known outcome in mathematics. Because of this ability, it has generated interest among mathematicians. The tree has many interesting patterns and properties that have been explored by mathematicians. Recently, the tree was generalized to an $m$-ary tree where some of these patterns and properties no longer hold. However, new properties can be found in the $m$-ary tree. For this project we consider the Calkin-Wilf 3-ary tree. We can determine the position of the Calkin-Wilf binary tree fractions in the Calkin-Wilf 3-ary tree, determine how many times a certain fraction appears within any given level, and predict and describe the behavior of multiples within the tree. We use these observations to give a general description of any given level.
Oral Presentations – Session II

Margaret Elizabeth Vacher-Weill, Mentor: Dr. Jennifer Mead
(Movement Arts, Health Promotion & Leisure Studies)
*Transitioning Out of Sport: Athletic Identity and the Experience of Career Termination in Elite Soccer Players*

Athletes often pursue the same dream throughout childhood and into their adult lives, and many athletes don’t have a dream beyond that of being an athlete. When the role of an athlete becomes ingrained as part of their identity, challenges often arise when their career ends. Though not often discussed, having an identity, or a role that one can identify oneself with, can be a crucial part of leading a meaningful life, whether within a job, as a scholar, or as an athlete. The focus of this research has been to examine the experiences and challenges of career termination in high level female soccer players, such as Division I, and professional players. Through six, semi-structured interviews with these current and previous athletes, grounded theory has been used as the approach to examining the data from the interviews that have been transcribed. The interviews focused on the history of the athletes, and all of the positive and negative experiences that have led them to where they are now in relation to the sport of soccer. In the analysis of the interviews, there is reason to conclude that there are certain themes recurring throughout the experiences of the athletes that have led them to where they are today. There is incentive to share the findings, and continue this research throughout the year, in order to spread the understanding, and support, for athletes experiencing termination not only from their career, but also from an identity.

Brett Franzie, Dr. Inkyoung Kim (Political Science)
*Sovereignty Before Rights: Human Rights Universalization in International Law*

The end of World War II sparked the international movement to universalize human rights by the United Nations (UN). The world vowed
to prevent all forms of transnational human suffering. The primary method for spreading human rights in international law is through treaties. This study examined why states ratify human rights treaties and what factors impede the globalization of human rights. Treaty ratification data compiled by the UN and former scholarly work was studied to understand why states ratify treaties. Treaty reservations held by the United Nations Treaty Collection were analyzed to reveal what objections states have towards universal human rights. A reservation is a statement made by a state that unbinds it from having to obey a particular treaty article. The research found that the low political cost of treaty ratification is why states ratify treaties. The data collected illustrates that states are more likely to ratify treaties with weak enforcement mechanisms and less likely to ratify treaties with strong mechanisms. Furthermore, the observation of treaty reservations highlighted that sovereignty and culture are the two biggest threats to universal human rights. This research is significant because it exposed a fundamental flaw in the international human rights regime which weakens the ability to spread human rights. Also, the research adds empirical evidence to the existing literature explaining the treaty ratification behavior of states. Ultimately, state sovereignty supersedes human rights in international law.

**Vanessa Sherman,** Mentor: Dr. Jordon Barkalow (Political Science)

*Testing Tocqueville: The Political Theory of the “Mayflower Compact” and Its Legacy*

Following Alexis de Tocqueville, the strong form of the continuity thesis maintains Puritan political thinking shapes American political thought. This argument assumes that religiously inspired political thought of the Puritans spread throughout the Commonwealth and New England, and the rest of the country. This project tests this by developing the political theory of the *Mayflower Compact* and testing for the influence of the ideas in the *Mayflower Compact* on communities established after the foundation of Plymouth in 1620. The first task is accomplished by augmenting the political principles of the *Mayflower Compact* through an analysis of other documents. This demonstrates that key symbols of the
Mayflower Compact include popular sovereignty and Christians deliberating the ends of government. Determining the influence of these ideas is done through analysis of the archives of Scituate (1636) and Taunton (1637). This reveals an emphasis on property rather than concern with public deliberation by a community of Christians. This finding raises doubts about the legacy of the Mayflower Compact’s religious principles and Tocqueville’s assumption. This conclusion is supported by an analysis of the political symbols of Plymouth and Massachusetts Bay over time. In both communities, evidence is found suggesting a weakening of religion and a growing concern with property and other individual rights. While the results presented here cannot reject the strong form of the continuity thesis or identify its alternative, they do point to a number of tensions within colonial American political thinking in need of resolution.

Theresa Aldrich, Mentor: Dr. Margaret Boyd (Social Work)
A Case Study of a Therapeutic Farm Community with Ethnographic Methods

This project is a case study of a single therapeutic farm community using ethnographic research methods with the goal of understanding the community as a whole organization. A therapeutic farm community is a treatment model that originated in 1792 Europe with the purpose of treating a variety of behavioral, developmental, and mental health issues. Therapeutic farm communities are based on the idea of using agricultural practices, manual labor, and a sense of community belonging as an intervention. To understand the therapeutic farm community which was selected for this case study, ethnographic methods were utilized to gain a more in depth comprehension of the organization as a complex system. To engage in ethnographic research is to be both an objective and subjective participant observer, with the goal of understanding and exploring a given setting without criticism. Using this method, allows the researcher to enter the social world of a therapeutic farm community as a volunteer intern, living and working alongside residents and staff alike for 7 continuous weeks. While integrated in the community, rich
qualitative data was gathered on an ongoing basis. Two main themes emerged from the raw data: first was the difference between written roles versus the expected roles for staff members, second was the residents’ attitudes towards manual labor and towards the social community. Continued analysis will be conducted on the collected data to explore patterns and themes to more thoroughly understand the therapeutic farm community as a whole.

**Sadye Pavao, Mentor: Dr. Edward Carter (Special Education)**

*What Do I Do When They Won’t Stop Moving?*

Disruptive Behaviors in schools are behaviors that prevent oneself or another student from learning. Disruptive behaviors are defined as anything as severe as touching others to something as mild as repeatedly tapping a pencil. There are wide ranges of intervention strategies designed to support students with disruptive behaviors. For example, creating a daily report card where a teacher targets one specific behavior for a student to manage. This project explores the range of teacher interventions used to decrease disruptive behaviors through conducting the following activities at the Central Elementary School in East Bridgewater, MA: 1) a comprehensive literature review; 2) a survey questionnaire 3) follow-up interviews with teachers; and 4) an exploratory case study with a behavior specialist. Additionally, this investigation defines a detailed description of the role of a behavior specialist. This study specifically addresses the following questions: What are the most common disruptive behaviors teachers see in their classroom? What are the most effective intervention strategies used in an elementary school setting to reduce disruptive behaviors? What is the role of a behavior specialist? Results of the investigation indicated the most reoccurring disruptive behaviors in classrooms are students getting out of their seats and inappropriately talking out. The intervention strategies teachers recommended using most were movement breaks and alternative seating. Teachers were also highly supportive of the Responsive Classroom as a non-tactile intervention strategy. With the data collected using the procedures described, the investigator created
an original decision-making model to guide the choices teachers make to decrease disruptive behaviors.

**Kaitlyn Peterson, Mentor: Dr. Edward Carter (Special Education)**

*Investigating Decision-Making Models for Multi-Tiered reading Interventions for Struggling Readers*

Reading is a skill that is necessary for students of the 21st century to master. To become successful readers, school systems begin teaching reading as early as Kindergarten, and students continue learning valuable reading skills through their entire academic career. However, not all students are able to successfully master the skills needed for reading as quickly as their peers. Ideally school systems would provide these struggling readers a tiered model of intervention strategies using ongoing assessments of the students’ reading skills to guide their intervention needs. This important decision-making process helps ensure that all students have the best possible chance to be successful readers. This research project explored the elements that go into the decision-making process of determining reading interventions for struggling readers using a multi-tiered model for elementary education settings. The research design included conducting an extensive literature review, disseminating a survey questionnaire to reading specialists, interviewing reading coaches and other educators involved in the decision-making process for determining reading interventions, and conducting a case study which examined the role of a literacy specialist. From the data collected, the researcher compiled information from both the current literature and what is practiced in the field to design a decision-making tree for navigating tiered interventions to support struggling readers in elementary school settings.
Oral Presentations – Session III

Matthew Gregory Scott, Mentor: Dr. Heidi Bean (English)
American Life After the Apocalypse: Anxieties About the Politicization of Media in Young Adult Dystopias

In 2008 the first book of The Hunger Games trilogy by Suzanne Collins was published, ushering in a wave of Young Adult dystopian fiction which gained popularity that appealed to audiences of all ages. Other series, such as Veronica Roth’s Divergent and James Dashner’s The Maze Runner, followed the release of The Hunger Games, with each series reaching enough readers of all ages that they eventually were made into Hollywood blockbuster movies. Why did these novels become as popular as they did? What did these novels touch on that resonated so strongly with audiences across a wide spectrum? One of the characteristics of dystopian fiction is its critique of sociopolitical trends of the period in which it was written, and these novels were no exception. Written in the early 2000’s, these novels show demonstrate anxieties regarding how new forms of media, such as social media and reality TV, might be abused by government to control the narrative people get through their media, and how that power could be used to create authoritarian power. These novels highlighted the potential for abuse enabled by this new political trend - a trend which has since escalated, and enabled interference in our politics from organizations seeking to exploit the political system for their gain.

Genesis Galan, Mentor: Dr. Kimberly Davis (English)
The Construction of Identity in African American Male Adolescents

This research project proposes that psychological research about adolescent identity does not fully address the specific experience of African American male adolescents and their exploration of identity. I use a psychological lens to analyze memoir, semi-autobiographical novel, and autobiography/biography produced by four African American male writers. I began by researching the genres of life-writing as well as key
psychological theories of identity and adolescence. In each text, I identified important themes of identity construction and compared the first person narratives to the scientific literature on identity, in order to determine which factors had been left out and to propose new research questions about African American male identity. This research suggests that black male adolescent identity is highly influenced by media portrayals of black men, as well as an individual’s socio-economic status and the amount of available identity options to explore during this stage. So far, I have concluded that African American males have more pressure than most adolescents because they are often negotiating more dimensions of identity, with fewer options, less guidance, and fewer role models. This research project could help African American adolescents to understand what they may be going through, just as it may help many of us—teachers and counselors especially—to understand what role we can play in helping these males see themselves for who they want to be and not who they believe that they need to be.

Janene Johnson, Mentor: Dr. Ann Brunjes (English)

Re-visioning Womanhood: Realism in Catharine Maria Sedgwick’s Nineteenth-Century Novels

Despite recent scholarly interest in Catharine Maria Sedgwick (1789-1867), she remains underrepresented in the canon of American literature primarily because twentieth-century scholars viewed the work of nineteenth-century female novelists as melodramatic and unrealistic. My research disputes this misunderstanding by evaluating Sedgwick’s contribution to the collective cultural effort to create a new written voice embodying the ideals of the new nation. Rather than study Sedgwick’s best-known works, I focus on her shorter didactic fiction. The three didactic novels that I discuss were intended to teach a wide audience about the social norms and political structure of the early Republic. Each novel focuses on different elements of society but collectively envision a model community. Sedgwick uses the didactic form to question current political conflicts, constructing characters that express real concerns for people in the Republic. I read Sedgwick’s novels through a New Historicist
lens to analyze the relationship between discourse and ideology in her writing. I paired this approach with feminist literary theory to frame Sedgwick’s didactic writing in the climate of her time. At the outset of this project I expected Sedgwick’s writing to challenge the repressive atmosphere for women in post-Revolutionary America, but my research lead to different results. Instead of revisioning Republican womanhood with a conceptualization of women’s independence, Sedgwick illustrates a more socially conservative attitude. Sedgwick promotes a tempered progressive approach to expanding women’s roles: she rejects a return to a pre-Revolutionary society, therefore insisting on progress, but limits women’s learning and influence to the domestic sphere.

Elizabeth Tobin, Mentor: Dr. Kimberly Davis (English)

_Mental Illness and Psychological Conditions in 19th and Early 20th Century American Literature_

While reading Sherwood Anderson's _Winesburg, Ohio: A Group of Tales of Ohio Small-Town Life_, one of Anderson's early characters, Wing Biddlebaum, appeared to me to be displaying symptoms of high functioning autism. In 1915 when this story was written autism had no diagnosis. Anderson must have written this character without even realizing that he was personifying a psychological condition. This realization put me on the path to investigate this phenomenon of undiagnosed mental illness or psychological conditions in the characterization of other 19th and early 20th century American authors. At that time in America's recently instituted asylums, most psychological diagnoses and treatments were mainly based on three major social fears at this time: racism, sexism, and a general fear of otherness, or people who do not easily fit into social norms. The authors I have chosen who have written these types of characters were often in direct conversation with these institutions, and their writing supplemented what doctors did not yet know. Edgar Allan Poe's _The Tell-Tale Heart_, Charlotte Perkins Gilman's _The Yellow Wallpaper_, and Howard Phillips Lovecraft's _Beyond the Walls of Sleep_ most accurately depict this. This research is important because it shows what American literature can do to give different insight
into understandings of mental illness and psychological conditions in 19th and early 20th century America. This research also informs my Departmental Honors thesis in English at Bridgewater State University.

**Brian Dolle and Zachary Ells**, Mentor: Dr. Thaya Paramanathan (Physics)

*Quantifying Anticancer Drug Doxorubicin Binding to DNA using Optical Tweezers*

Optical tweezers use finely focused laser beams to hold micron-sized objects which provides a method of isolating and manipulating a single DNA molecule. The DNA can be stretched and the tension in the DNA measured as a function of extension. The same measurements can be taken after introducing anticancer drugs into the system, enabling us to quantify how the drug binds to DNA. Our original research proposal was to quantify the binding behavior of the anticancer drug Lapatinib to DNA. After initial experimentation, we found Lapatinib to be insoluble in water, preventing further study using optical tweezers. We then decided to research Doxorubicin, another anticancer drug in use since the 1970s. We collected and analyzed preliminary data at five different drug concentrations. The preliminary results suggest a more complicated binding mechanism and higher binding strength than previously thought, but we need more time to report definitive results. This will be the first quantification of Doxorubicin as a DNA binding drug using single molecule biophysics techniques. Based on these early findings we strongly anticipate that this study will provide critical information about the drug binding mechanism and potentially influence dosage of Doxorubicin administered to patients.

**Adam Jabak**, Mentor: Dr. Thaya Paramanathan (Physics)

*Exploring how Chirality Affects the DNA Binding Properties of Threading Ruthenium Complexes Using Optical Tweezers*

An optical tweezers is a scientific instrument used to trap tiny objects with a highly-focused laser. We have been using optical tweezers to trap a single DNA molecule and investigate the binding properties of
prospective cancer drugs. A particular type of these drugs are known as intercalators which have a planar section as a part of their structure that can slide between the DNA based pairs and act as a road block to DNA replication thus causing the death of cancer cells. In this project, we explore the DNA binding properties of a ruthenium-based threading intercalator $\Lambda\Lambda$-P. Threading intercalators are small molecules that have the intercalating planar section in the middle of the molecule, therefore these molecules have to thread their side chains through the DNA bases to intercalate their central planar moiety between the DNA base pairs. These molecules typically fall into the class of prospective anti-cancer drugs since they exhibit high binding affinity and slow kinetics. We have been investigating to see whether chirality can affect the binding properties of these molecules by comparing this molecule to the previously studied $\Delta\Delta$-P, which has the same chemical structure but an opposite chirality (handedness). Our data currently supports that $\Lambda\Lambda$-P and $\Delta\Delta$-P have a similar binding affinity but $\Lambda\Lambda$-P has faster binding kinetics in comparison. Given that the middle intercalating moiety is the same in both molecules, helps explain the similar binding affinity. Also, the chirality difference shows to affect the kinetics, favoring the left handed ($\Lambda$) chirality which exhibits faster association and dissociation rates.

**Poster Presentations – Session II**

**Board-2**

**Karly Foster,** Mentor: Prof. Miranda Giurleo (Theater)

*A Study in Late Victorian Women’s Garment Construction for the Stage*

I researched garments and patterning methods from the late Victorian time period, with a focus on the 1890’s, culminating in the creation of a half-scale Victorian walking dress and appropriate undergarments as might be worn on stage by an actor. Theatrical costume design and construction requires in-depth research into time periods, cultures, and art. Attention to historical accuracy is crucial, as is adapting historical
style lines to the bodies and movement needs of contemporary actors. For example, upper class women in Victorian times did not often have full range of movement of their arms due to the way their bodices fit, but for stage, actors need to be able to lift their arms and the pattern must be modified from historical accuracy to allow for movement and to prevent tearing. The construction of the dress began with learning dart manipulation through a series of exercises with paper, which led to modifying the basic bodice block patterns. After draping bodice and skirt blocks on the mannequin and truing the patterns on paper, I manipulated the pattern blocks to create each element of the final garment by moving darts and adding pleating and gathering. The process has solidified my passion for costume design and technology and I look forward to further developing my skills in these areas.

**Board-4**

**Samantha Cushman, Mentor: Prof. Leigh Craven (Art & Art History)**

*Exposing my Insanity: An Exploration of Mental Illness*

I researched and investigated mental illness as subject matter in the body of artwork I created. Mental illnesses are common in the United States, affecting tens of millions of people each year. Due to this, my goal was to bring visual representation to mental illness. The body of artwork I created depicts my personal relationship with mental illness. These works have been made using a variety of mediums such as printmaking, bookbinding, and embroidery. In printmaking, I focused on the intaglio and lithographic printmaking processes. The intaglio printmaking method is characterized by an image being cut into the surface of a plate. Traditionally the matrix is copper, zinc or other metal and the cutting is made with sharp hand tools or by using acid. When ink is applied to the plate, it is held in the incised image areas and wiped from the surface, then printed on a press on dampened paper. In the lithographic process, ink is applied to a grease-treated image on the flat printing surface; nonimage areas, which hold moisture, repel the lithographic ink. This inked surface is then printed directly on paper. The book projects I made explore what a book can be and one utilizes the German case style of
bookmaking. Each of these pieces focus on displaying my emotional and personal struggles related to mental illness though relevant subject matter. Through this collection of artwork I hope to help someone else struggling with his or her relationship with mental illness by exposing mine.

Board-6

Cameron Lee Covert, Mentor: Dr. Daniel Lomba (Economics)

Influences of Gasoline Price Fluctuations on Consumer and Fleet Transportation Preference

As gasoline prices increase or decrease, consumers adjust their automobile buying preferences. My study shows that if the price of gasoline is high or is in the process of increasing, consumers are more likely to purchase smaller and more fuel-efficient automobiles. If the price of gasoline is low, consumers are more likely to purchase larger and less fuel-efficient automobiles. The reason for this is based on what a consumer can afford. If the price of gasoline is high, consumers are less likely to be able to afford larger vehicles, such as pickup trucks and large SUVs. My study consisted of collecting data from academic journals and automobile sales figures from carsalesbase.com. This website provided sales figures for 2000 to 2017 for each type of automobile by manufacturer. I graphed this data and observed that as the price of gasoline increased, sales for some manufacturers such as Hummer, Isuzu, Mercury, Pontiac, Saab, Saturn, and Suzuki started to drop dramatically. Eventually these manufacturers went out of business and employees lost their jobs. Before the economic crisis, the price of gasoline increased which led to a decrease in sales of larger automobiles causing some to become discontinued from a manufacturer’s line up. During the economic crisis, automobile sales were low. After the economic crisis, sales started to increase slowly, primarily for more fuel-efficient automobiles.
An Examination of the Effects of Aquatic Activities on the Motor Skills of Autistic Children

Research has been conducted on including programs for disabled population, especially children, outlining the barriers they face while participating in such activities. Programs have recently been set in place to include children with disabilities in activities within the water, and YMCA is one of the most popular youth organizations for physical activity. The purpose of this study was to examine the effectiveness of different instructional methods used in a swim lesson designed for autistic children for motor skills development. Two autistic children were evaluated over a three-week period of swim lessons, in a 30 minute lesson per week; one child was in an upper extremity instructional group while another child was in a lower extremity instructional group. Pre and post testings were conducted prior and after the three week period on throwing a tennis ball, kicking a soccer ball, jumping over small hurdles, and a broad jump. The results showed little improvement for the child who participated in the upper extremity instructional method both qualitatively and quantitatively. This finding may be because the child has participated in this type of swim program previously, so the improvement is more minimal. The child who participated in the lower extremity instructional method showed high improvement qualitatively, especially the soccer kick and hurdle jump. This could suggest that focusing primarily on lower body movements using larger muscle groups may improve mobility better. The study provides an important preliminary understanding for parents in selecting an appropriate swim program for motor development for their autistic children.

The Effects of Sports Participation on Working Memory in Young Adults

The study provides an important preliminary understanding for parents in selecting an appropriate swim program for motor development for their autistic children.
Sports-related concussive and sub-concussive injuries may cause cumulative and long-term effects on cognition generally, and working memory specifically, for young-adult populations. The purpose of this project was to investigate how working-memory performance may vary with risk of concussion. As sports participation is a source of potential injury, we interpreted the performance of our participants based on their risk of concussion, operationally defined as average hours a week spent participating in sports, with consideration given to self-reported concussions. Student and student-athlete volunteers completed a questionnaire assessing sports participation and concussion history. They then were administered two working-memory tasks to assess visual and verbal working-memory. Participants were categorized into one of two groups based on risk, creating a high-risk group and a low-risk group. There was no statistically significant difference between high-risk and low-risk groups in accuracy or reaction time on the working-memory tasks. Though there was no statistically significant difference, there was a numerical trend suggesting that high-risk participants took longer to complete the tasks than the participants at low risk for concussion. Due to the small number of participants, it is not clear whether concussion risk related to sports participation impacts working-memory, but the difference in mean reaction times may suggest that it has a negative effect. More research is necessary to determine whether concussion risk due to sports participation impacts working memory.

Board-12

Julie Rebecca Clerge, Mentor: Dr. Wendy Champagnie Williams
(Social Work)

“I Belong Here”: An Investigation into the Key Factors that Foster Self-Efficacy in Academically Successful Minority Students

In 2016, data from the National Center for Education Statistics reported that minority students have the fewest conferred degrees in the United States (Snyder, 2016). A review of the literature has attributed this
phenomenon to various factors. These factors include socioeconomic status (Harvey, 2016), parents’ education level (Faye Carter, 2006) and lack of cultural congruity with the institution (Edman, 2008, Trueba, 1988 and Tierney, 1999). Of course, there are minority students that deifies the statistics and have achieved academic success. Research (Voung, 2010; Peguero, 2015; Galyon, 2012; Zajacova, 2015; Byrne, 2014) has shown that self-efficacy improves academic success. Due to these findings, the purpose of this research was to determine what factors help create a strong sense of high academic self-efficacy in academically successful minority students. Guided by a strength-based perspective, this study explored factors that fostered self-efficacy, enabling minority students to attain academic success. This research utilized qualitative interviews with 10 minority students from Bridgewater State University. The results of this study will help support the implementation of effective, evidence-based practices to support minority students who experience academic challenges. In preliminary data analysis, it is apparent that formal and informal relationships play a key role in helping to foster academic self-efficacy. Future research will focus on the elements of these kind of relationships that made them impactful for students with high self-efficacy.

Board-14

Allison S. Bernique, Mentor: Dr. Elizabeth R. Spievak (Psychology)

Lights, Camera, Anxiety: The Spotlight Effect, Social Anxiety and the Perception of Gaze Direction

The goal of the current project was to replicate and extend research on spotlight effect, a term used to describe the feeling of being the focus of others’ attention (Gilovich, Medvec, & Savitsky, 2000). The spotlight effect has been linked to social anxiety, or the fear of negative social evaluation and scrutiny (Lipton, Weeks, Daruwala, & Reyes, 2016), however there is little literature on how the spotlight effect might be linked to distorted perceptions of others’ gaze direction (averted or direct). To address this gap in the literature, methods and materials from research on social anxiety, the spotlight effect, and eye gaze were
combined. Participants completed measures of social anxiety, rated faces in a reaction time paradigm, and responded to vignettes that described typical, but mildly uncomfortable, social situations. Half of the participants completed the study in a darkened room with no researcher present, and half completed the same study with the lights on and a researcher present. The hypothesis that being observed by a researcher would prime the spotlight effect, particularly in those who scored higher in social anxiety, was supported. The effect was strongest in responses to vignettes, where trait self-consciousness of observed participants predicted the degree to which they felt attention and a spotlight would be on them, and that they would be obligated to represent their in-group. There was less support for the hypothesis that judgments of eye gaze would be similarly biased by researcher observation.

**Board-16**  
**Ingrid Hasselquist**, Mentor: Dr. Teresa King (Psychology)  
*The Significance of Training and Education: An Analysis of Attitudes Surrounding Narcan at Bridgewater State University*

With the opioid crisis growing at an alarming rate, it is vitally important to evaluate harm-reduction strategies. Bridgewater State University (BSU) recently became the first college in the U.S. to make opioid overdose kits (Narcan) publicly available. The primary aim of this research was to determine if education and training improved attitudes, knowledge, and self-efficacy regarding Narcan use, as well opioids, opioid use, and opioid users. A secondary aim was to assess attitudes regarding opioid use and abuse at BSU. The efficacy of a Narcan training in changing attitudes and knowledge about Narcan was evaluated using a pretest post-test design. It was hypothesized that participants would report more positive attitudes and greater self-efficacy regarding Narcan use, and more positive attitudes regarding opioid use and opioid users following this training. Attitudes and stigma regarding opioid use and treatment were examined by survey utilizing the Psychology Department’s Participant Pool. Knowledge and attitudes surrounding Narcan, as well as affect toward opioid users significantly changed after
the training. These results demonstrated Narcan training to be an important tool in fighting the opioid epidemic in that it improves individual knowledge and attitudes surrounding Narcan use at BSU which can be applied to societal attitudes about using Narcan, making it an effective harm-reduction strategy. They also showed that Narcan training can improve attitudes regarding opioid use and users, which aids in reducing stigma associated with them, therefore moving towards better providing users with the help they need in order to move towards eradicating the opioid epidemic.

**Board-18**

**John L’Heureux**, Mentor: Prof. Jamie Kern (Physics)

*Ensemble Photometry of Exoplanets at the BSU Observatory: Improving Previous Measurements and Streamlining New Ones*

When an exoplanet transits in front of a star, the subtle light curve dip can be difficult to identify if the data are sporadic. The main goal of my research is to improve measurement results. The main method I used is Ensemble photometry, but I also found initial improvements that should decrease the error in our data. Analysis of Tres-1b and Wasp-43b data showed that Ensemble photometry had 10% less average measurement error and a smaller residual than differential photometry if high signal to noise stars were used, though the results of ensemble photometry are heavily dependent on which comparison stars are chosen. I have also created a procedure manual on ensemble photometry for other student researchers at BSU to follow.

**Board-20**

**Mathew Driscoll** and **Alexis Correia**, Mentor: Dr. Christopher Bloch (Biological Sciences)

*Effects of Latitude and Prey Abundance on the Reproductive Output of the Asian Shore Crab*

The Asian shore crab (*Hemigrapsus sanguineus*) is an invasive species that has been known to have negative ecological and economic impacts
by causing declines in populations of prey species and competitors on the rocky shores of New England. A major reason for its success is its high reproductive rate compared to native crab species. We observed geographic variation in fecundity of the Asian shore crab at sites north and south of Cape Cod. We hypothesized that reproductive females south of Cape Cod would have a higher reproductive output than females north of Cape Cod due to warmer water temperatures south of Cape Cod. We found that there is a correlation between individual body size and fecundity, but no significant relationship between fecundity and latitude or prey abundance. Differences between individual sites were more significant than overall latitudinal differences. Future studies may test the relationships between fecundity and other environmental factors such as human interaction and wave disturbance.

Board-22
Emma Perry, Mentor: Dr. Edward Brush (Chemical Sciences)

An Investigation of Human Glyoxalase I Inhibition by a Glutathione-Methyleneoxindole Conjugate as a Means of Anti-cancer Therapeutics

The glyoxalase system plays a key role in cell growth regulation in all higher eukaryotes, as it catalyzes the conversion of cytotoxic methylglyoxal (MG) to lactic acid. Inhibition of the first enzyme in this pathway, Glyoxalase I (GxI), is known to result in an accumulation of MG, causing cell death. This would normally not be beneficial to healthy cells, but could be used as therapeutic treatment on cancer cells. The goals of this project were to characterize and evaluate the chemical mechanism by which a Glutathione-Methyleneoxindole conjugate (GSMOI) inhibits human GxI, and to determine if this process is found to be reversible, irreversible, or a combination. GSMOI was synthesized from 3-methyleneoxindole (MOI) and glutathione, and all compounds were characterized by melting point and Nuclear Magnetic Resonance (NMR) spectrometry. Enzyme reactions were conducted by monitoring product formation using UV-Vis spectroscopy at 240 nm, and initial rate kinetic analysis was done using Lineweaver-Burk plots. Our preliminary data suggest that GSMOI is a reversible inhibitor of human GxI, and there may
be cooperative interaction between the two active sites on the enzyme. Furthermore, we also have preliminary evidence that GSMOI is a time-dependent irreversible inhibitor of human Gxl. Future work includes determining the Ki of GSMOI for human Gxl, and whether the enzyme is catalyzing GSMOI breakdown to form free MOI, which can then alkylate the active site. This research was supported by the Bridgewater State University Department of Chemistry and by a summer 2018 grant from the Adrian Tinsley Program.

Board-24
Christian Santos, Mentor: Dr. Sarah Soltau (Chemistry)
An Investigation to Locate the Binding Site and Mode of Electron Transfer between Two Proteins, KshA and KshB.

Many bacteria have adapted to common medicines and developed resistance to antibiotics. One of these drug-resistant bacteria is Mycobacterium tuberculosis, a deadly organism that continues to plague many countries today. The mechanism behind these antibiotic-resistant strains of tuberculosis needs to be better understood to develop new effective antibiotics. This project studied two proteins, KshA and KshB, found in M. tuberculosis in order to better understand one aspect of tuberculosis infection. These two proteins interact and transfer electrons and this study investigates the shape and structure of the protein complex. To reach these goals, plasmid DNA was isolated by transformation into DH5α cells and purification. The proteins were expressed by cell culture and IPTG was added to induce further protein expression. The proteins were purified with Ni-NTA chromatography, and afterwards the structure and molecular weight of the KshA and KshB complex were analyzed by size-exclusion chromatography and native gel electrophoresis. These experiments showed two bands: one band is approximately 250 kDa, which corresponds to the size of a KshA trimer each attached with three KshB monomers, and another with a much higher molecular weight. The higher molecular weight suggests that there may be protein aggregation occurring. To remove this aggregation, conditions such as pH will be altered in future experiments. Successfully
characterizing this enzyme complex will allow for future development of enzyme inhibitors and new antibiotics for tuberculosis.

Board-26
Neha Kharidi, Mentor: Dr. Michael Black (Computer Science)
Educating Middle-School Children in Digital Design

Digital Design details how a set of software and hardware technology standards interact to form a computer system. There are plenty of resources available in the world to learn the software side of digital design, but very limited ways to learn the hardware aspect. The middle school age is a crucial time in a child’s development, because this is when they start to pursue their interests. If there are no tools for people at a young age to learn Digital Design then it will continue to be a field that is over looked. The purpose of this research was to learn how to create an Android application from scratch, to be used as a tool to educate middle-school-age children on the basics of computer hardware. The project uses the Introduction to Computer Organization course taught at Bridgewater State University as a foundation. To begin learning how to create an Android application, I enrolled in a series of online courses that taught me the fundamentals of app development. In these courses, I created several applications that performed specific tasks. During the process of learning the basics of app development I started to create wireframes, which are drawn out models of how I want my future app to look. The online app development courses taught me how to connect my knowledge of Object Oriented Programming to the creations of an app. Using the Java programming language as well as the XML markup language for visuals, I learned how to build layouts in order to make the user experience enjoyable. In addition, I learned how to take data from user input and produce a desired result.

Board-28
Zenan Sun, Mentor: Dr. Kevin Rion (Mathematics)
How Do Solar Panels Substitute the Total Electricity Generation in the US?
Solar energy is used as a form of clean energy nowadays. Solar panels absorb solar energy and convert it to electric energy, which can be stored in cells or immediately provide electricity to households. We have designed mathematical models based on historical data for solar radiation and temperature for 10 cities (Honolulu, Denver, Houston, Las Vegas, Los Angeles, San Francisco, New York, Philadelphia, Orlando and Phoenix), that can be used to predict the energy output of solar panels. Our mathematical models illustrate the differences in energy production of various cities that would be due to temperature and solar radiation alone. They also provide useful graphical displays of the cyclic pattern of predicted per solar panel energy production throughout the year for these cities. From the result, we can also make some suggestions about the placement of solar panels.

**Oral Presentations – Session IV**

**Samantha Correia, Mentor: Dr. Joyce Rain Anderson (English)**

*Searching for Identity: Connecting Students to Young Adult Literature in the Classroom Through Language*

This research examines the way that language and identity intersect in young adult literature, and how these texts can be taught in the classroom to help students think about their own identities. I have chosen five novels that are all considered young adult texts; most of these novels have been published in the last five years and are inclusive of characters from various cultural backgrounds and/or are part of the LGBTQ community. I looked at the different ways that language can represent itself in the texts, specifically non-English languages, code-switching, social norms, cultural stories, and more. This research is focused on how to teach these books in a middle/high school classroom and how representation can help students to connect with a text. By connecting with an experience in a text, students can reflect on their own histories and identities. I analyzed each text for themes, writing style, and symbolism, as well as for ideas on how to teach each text, and recorded
these ideas in reading journals. I then designed a lesson plan for each book, while thinking about how to have conversations about language and identity. I connected my ideas to other research articles and educational resources about social justice, representation, identity, and teaching. Technology resources for teaching were also part of my research; for example, using databases or researching why a book might be considered a “banned book.” Identity in young adult literature is important for students and should not be ignored in the classroom.

**Dawna Vella**, Mentors: Dr. Joyce Rain Anderson (English) and Dr. Joseph Schwab (Psychology)

*Identity Exploration through Content-Based Creative Writing with Native American Adolescents*

Identity exploration is an essential process for any adolescent; in the face of oppressive government policies, pervasive stereotypes, and historical trauma, Native American youth, the group highest at risk for suicide, must explore and construct positive self-concepts in order to survive. This project examines how Native adolescents explore their identities through creative writing, as a possible outlet for identity expression in the classroom. Participants were ten Native American high school students (five male, five female, ages 15-17) from Red Cloud Indian School on Pine Ridge Reservation in South Dakota. These students participated in two focus group discussions surrounding cultural identity and classroom writing experiences, brainstormed ideas for an ideal writing exercise, and responded to a researcher-created writing prompt. Analysis will consist of coding common themes and rhetorical approaches in participant writing samples, reviewing transcripts of focus group discussions, and integrating this information with both existing research and informal discussions with scholars and educators. Preliminary observations have included participants bringing up historical trauma, connections between participant identity and physical spaces, and participants’ strong empathy toward others.
George Washington is typically depicted by the general public as a strong, yet selfless leader; becoming deified in American history for his leadership, bravery, and simple popularity. Despite winning independence from the British Empire in 1783, the government created by the Articles of Confederation was far from satisfactory in Washington’s eyes. Shortly after the Revolutionary War, the general criticized the new government, and the Congress that was at its head, in private letters, calling for a stronger, more centralized government. Following the outbreak of Shays’s Rebellion in 1786 over rising taxes, Washington was appalled by the lack of regard for public justice shown by Daniel Shays and his co-conspirators. As president of the Constitutional Convention and first President of the United States, he oversaw the creation of a stronger central government. Not all Americans, however, appreciated the government’s increased power. Using its power to raise revenue through excise taxes, the new government levied taxes on liquor distilled in the United States, but rebels in Western Pennsylvania were far from accepting of the government’s newly-minted powers. When the Whiskey Rebellion began in opposition to these new taxes, Washington’s government was able to enforce the law of the land, rather than fumble over administrative and legal ambiguity. Washington’s actions in 1794, as compared with the government’s response to Shays’s Rebellion, set precedents that breathed life into the Constitution, elevating him from selfless leader to empowered ideologue.
Representing Absence: Substance and Essence in Zen Buddhist Art

This project examined the relationship between religious thought and material form in the visual culture of Japanese Zen sects during the Kamakura (1185-1333), Muromachi (1336-1573), Momoyama (1573-1603) and Edo (1603-1868) periods. Although Zen denies human sensory experience, high importance was placed upon the creation of realistic, life-like sculpture, visually arresting painting and expressive calligraphy as essential practices for Zen devotees. Through this study I developed a deeper understanding of how Buddhism developed a rich array of visual and material culture, despite its philosophical rejection of substance, essence and form. Buddhism holds that the material world is neither substantial nor essential. If nothing is substantial or essential, it follows that there is no self-nature, and all of existence is relative. Without self-nature, there is nothing inherent within an object that determines what it is. If objects only exist relative to other things, without fundamental substance and essence, only the external appearance, or the form and color of things, remain. Yet within Zen, the creation of art is a form of meditational practice connected to an important creed known as emptiness. Only through this complete absence of mental activity can one properly meditate, the apex of Zen. However, before emptiness can be achieved, the notion of Right Effort within practice and its attribution to all activities must be discerned. Emptiness is achieved through Right Effort and Right Practice, such as painting or simply breathing. The dualistic notions that surround the Zen conception of physical reality both inspired and stunted my research, but from my reading I came to understand the concepts associated with the rich array of practices, including art-making.
Daniel Moriarty, Mentor: Dr. Ryan LaBrozzi (Center for Sustainability and Global Languages & Literatures)

*How Converging Internet and Green Technologies can Stimulate a Collaborative Agricultural Revolution in the Face of Climate Change*

The world is on the cusp of massive environmental and technological disruption, both of which will seriously impact global agriculture. Climate change is disrupting seasonal growing patterns in a food system which is highly centralized, economically monopolistic, and extremely vulnerable to disruption. For the first time in human history the technology exists for local food economies to step outside of the global food system and create their own food systems where production is healthy, fresh and climate resilient while distribution and consumption are localized and decentralized. Innovations in computing technology such as the internet of things, the blockchain, machine learning and robotics allow for small farms to become “smart” where productivity is maximized while resource use is minimized, and the entire process becomes less labor intensive. Combining these systems with holistic/organic agricultural practices and powering them with an infrastructure of renewable energy cooperatives allows for distributed resource security from the neighborhood to the regional level in a manner which is sustainable, healthy, and democratic. The purpose of this project is to explain these technologies, provide a framework on how they can be applied to small farming and push the necessity that this adoption happens at the grassroots level by showcasing the urgency of climate change and the political corruption behind the systemic inaction towards it.
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