18TH ANNUAL CELEBRATION OF STUDENT RESEARCH, SCHOLARSHIP & CREATIVE WORK

JANUARY 26, 2018 | WABASH COLLEGE
DETCHON CENTER

Welcome and Introduction

Welcome to the 18th Annual Celebration of Student Research, Scholarship, and Creative Work at Wabash College. For the past 17 years, the College has recognized in a proud and public way the creative accomplishments of Wabash students. We celebrate not only the particular achievements of individual students, but also a deeply embedded ethos of the College. The impressive breadth and quality of student creative work is evidence of the challenge and change that marks the Wabash experience.

This program is dedicated to the memory of Paul Caylor McKinney '52, who passed away in 2003 after a courageous battle with cancer. Dr. McKinney proudly served the College for more than half a century as chemistry teacher, department chair, division chair, and Dean of the College. He was an exemplar of the liberally educated person whose interests ranged from quantum mechanics to Plato, from playing the piano to pondering Nietzsche. He acted in Wabash College Theater productions and was often found backstage working on difficult equations in his notebook. He was my mentor and friend, a master teacher who helped countless Wabash students develop their creativity and love of the liberal arts. Among Wabash men, he would well understand and appreciate everything presented today; he would be the first to celebrate the successes of Wabash students and faculty members.

Close collaboration between Wabash students and faculty across the College is a hallmark of our culture, a labor of pedagogy and love that makes a difference for our students. It is a special pleasure to introduce some of the results of that collaboration in these presentations. Our thanks go to the students who are prepared to teach the Wabash community about their good work and to the faculty and staff members who have devoted considerable time helping students in their research and creative productions.

A conference of this size and scope would not be possible without the dedicated work of many people. I want personally to express my thanks to the planning committee: Chair Lon Porter, Jeff Beck, Michelle Janssen, Damon Mohl, and Walter Novak. Aaron Elam, Drew Parrish, and ETS students contributed to the poster production, as have other ETS and IT Services staff; Becky Wendt formatted and prepared the program for printing; Campus Services, and Mary Jo Johnston and her Bon Appetit staff make the logistical support appear effortless. We also extend a special posthumous thanks to Chris Duff who for many years supported this event and all the work of the Celebration committee. Finally, we are grateful to all of you whose attendance supports this community Celebration.

—Scott Feller, Dean of the College

Schedule for Oral Presentations
Oral presentations will begin at 1:30 p.m. and continue every 20 minutes with a ten-minute break at 2:30 p.m. The last sessions begin at 3:20 p.m. In general, students will present information for 12-15 minutes with a few minutes for questions and passing time. Please see the following two pages for a list of oral presentations by room location and time slot. Names of the presenters, as well as their sponsors and abstracts, are listed in alphabetical order beginning on page eight.

Schedule for Posters and Exhibits
Students will present and discuss their posters and exhibits in 90-minute increments beginning at 1:00 p.m. across Detchon International Hall. You will find a list of presenters and their locations — sorted by poster number and alphabetically by lead presenter — beginning on page six. Names of the poster presenters and co-presenters, as well as their sponsors and abstracts, are listed by poster number beginning on page 16.

Schedule of Oral Presentations by Time Slot and Location

Detchon 109

1:30	Zachary Anderson	The Importance of Performance in Combating Ableism James Cherry (Theater)
1:50	Nathan Muha	Translating Memory: The Midwestern Opera Project James Cherry (Theater)
2:10	Jared Cottingham	*Do Not Resuscitate* James Cherry (Theater)
2:30	Break	----------
2:40	Christopher Szostek	The Untold Stories of Disney World: Disney's Morality Called into Question Jessica Mills (Theater)
3:00	Dajon Thomas	Traditions in African Art; Installation at MXI Elizabeth Morton (Art)
3:20	Christian Gosser	Celtic Music: The Culture that Never Died James Makubuya (Music)

Detchon 111

1:30	Anthony Eley	Pompey vs. the Cilician Pirates: More than just a Naval Campaign Sabrina Thomas (History)
1:50	Satchel Burton	Reasons to Fight: Why *Nisei* Men and Women Decided to Fight for the US during World War II Richard Warner (History)
2:10	Adam Kashin	Rereading Lady Mary Wortley Montagu: Challenging Said's *Orientalism* with Cultural Immersion and Diffusion Michelle Rhoades & Richard Warner (History)
2:30	Break	----------
2:40	Braden Quackenbush	Liberty in Federico García Lorca's *La casa de Bernarda Alba* Ivette Wilson (Modern Languages & Literatures)
3:00	Brient Hicks	A Critical Analysis of *The Reader* (*Der Vorleser*): *Vergangenheitsbewältigung* Literature Brian Tucker (Modern Languages & Literatures)
3:20	Erich Lange	Political Activism as a Component of Religious Commitment: Reflections from a Nazi Prison Brian Tucker (Modern Languages and Literatures)

Detchon 112

1:30	David Vavrinak	Ramachandran Outliers: Data Mining and Analysis Using the Python Language Charles Weiss (Chemistry)
1:50	James Kirkland, Eric Lakomek, Amadeo Rosales, & Shane Taylor	Quantitative Analysis of Copper Concentration in Wabash College Water Samples Ann Taylor (Chemistry)
2:10	Arthur Equihua	Menacing Mosquitos - Vector Control at the Montgomery County Health Department Jill Rogers (Global Health Initiative)
2:30	Break	----------
2:40	Christopher Wilson	Palmitic Acid Induces ER Stress in Hypothalamic Neurons: Implications for Obesity and Infertility Heidi Walsh (Biology)
3:00	Tyler Mix	Modeling Halo Nuclei with a Spherical Potential Well Dennis Krause (Physics)
3:20	Minh Quan Le Thien	Neutrino Flavor Mixing with Dirac Equation Dennis Krause (Physics)

Detchon 211

1:30	Oliver Page	The Painful Relevancy of Elizabeth Barrett Browning's *The Runaway Slave* Crystal Benedicks (English)
1:50	Aaron Webb	*Sundering Sounds:* Tonality, Volume, and Lord Alfred Tennyson's Grief Crystal Benedicks (English)
2:10	Simon Doughty	A Case for Post-Postmodernism: Ironic Malfunctions in Zoë Wicomb's *David's Story* Agata Szczeszak-Brewer (English)
2:30	Break	----------
2:40	Colin Rinne	Reflections of Authorial Privilege in Anti-imperialist Satires Natalie Aikens (English)
3:00	Patrick Jahnke	*Click* Eric Freeze (English)

Detchon 212

1:30	Samuel Gellen & Nolan Morse	A Data Driven Approach to Tax Audit: Synapse Data Analytics Roland Morin (Professional Development & Center for Innovation, Business, and Entrepreneurship)
1:50	Jack Kellerman	"The People's" Champion: Trump Scapegoating Politicians Jennifer Abbott & Todd McDorman (Rhetoric)
2:10	Christian Wirtz	Carly Fiorina's *Faces* Campaign Advertisement: Resisting the Political Status Quo Jennifer Abbott (Rhetoric)
2:30	Break	----------
2:40	Darren DeRome	Redefining Objectification in Videogames Matthew Carlson (Philosophy)
3:00	Jack Kellerman	The American Democracy-Technocracy Dilemma Lorraine McCrary (Political Science)

Schedule of Poster Presentations and Exhibits
(Detchon International Hall)

Session 1 — 1:00 p.m. to 2:30 p.m.

No	Presenters	Title
1	Miguel Aguirre	Determining the Signal Detection Range of Acoustic Sensors in Open Coastal Habitats Bradley Carlson (Biology)
3	Joseph Ballard & Hunter Jones	Investigation of New Notch Target Genes in Stem Cell Maintenance Erika Sorensen-Kamakian (Biology)
5	AJ Belden	Box Turtle Boldness: Responses to Simulated Predator vs. Confinement Assays Bradley Carlson (Biology)
7	Bryce Bridgewater	Cellular Proliferation in Regeneration of *Nematostella vectensis* Patrick Burton (Biology)
9	Tung Bui	Would Attributions Help to Alleviate the Envious Emotion? Neil Schmitzer-Torbert (Psychology)
11	Sergio-Steven Cobos	Synthesis of C2'epiAmB: A Possibly More Potent, Less Toxic Antifungal Derivative of AmB Walter Novak (Chemisty)
13	Cody Cochran	Timing and Position Calibration of the Modular Neutron Array James Brown (Physics)
15	Nigel Dao	Estrogen Influences Astrocyte Density in Forebrain Circumventricular Organs of Ovariectomized Rats Following Polyethylene Glycol-induced Hypovolemia Heidi Walsh (Biology)
17	Benjamin Geier, Hunter Jones, & Joseph Ballard	Loss of microRNAs mir61-250 Results in Notch Loss of Function Phenotypes in Somatic and Germline Tissues Erika Sorensen-Kamakian (Biology)
19	Mike Gore	Cyclopamine Inhibition of Hedgehog Signaling Regeneration in *Pristina leidyi* Patrick Burton (Biology)
21	Patrick Kenney	Evaluating Crack Behavior in Reinforced Concrete James Brown (Physics)
23	Charles Mettler	Effects of Garlic Mustard on Fungal Abundance and Decomposition Capacity Bradley Carlson (Biology)
25	Nhan Nguyen	C-terminal Domain of Mad1 Interacts with Mad2 to Catalyze O-C Mad2 Conversion in Coordination with Mitotic Checkpoints Walter Novak (Chemisty)
27	Nicholas Morin	Fish Community Structure: A Comparison of Trawl and Sonar Data Bradley Carlson (Biology)
29	Warren Moseman & Alec Bertsch	Transcription Factor C-fos Mediates Repression of GnRH Expression Induced by ER Stress Heidi Walsh (Biology)
31	Roarke Tollar, Nhan Nguyen, & Titus Edwards	Design and Construction of a Structural Model of the Bifunctional GlmU Protein in Complex with N-acetyl-D-glucosamine-1-phosphate and Uridine-diphosphate-N-acetylglucosamine Walter Novak (Chemisty)
33	Paul Haesemeyer & Digital Media Classmates	Animation & Digital Compositing Exhibitions Damon Mohl (Art)

Schedule of Poster Presentations and Exhibits
(Detchon International Hall)

Session 2 — 2:30 p.m. to 4:00 p.m.

No	Presenter	Title
2	Nigel Dao, T.J. Kilbourne, & Zane White	Exploring the Moral Foundations of Immoral Personality Traits Robert Horton (Psychology)
4	Charles Mettler	Root, Fungal, and Microbial Biomass Spatial Distribution in the Fungal Loop Hypothesis Amanda Ingram (Biology)
6	Zachary Patton	Investigating a Relationship Between Maturity and Responsibility Eric Olofson (Psychology)
8	Joe Pich	GPS Tracking of Box Turtles using Arduino Circuits Bradley Carlson (Biology)
10	Alex Pittsford, Connor Smith, & Nick Etter	Analysis of Trace Crystallinity in Amorphous Drug Formulations by Triboluminescence Paul Schmitt (Chemistry)
12	Andrew Puente	Expediting Protein-Ligand Docking Techniques for Drug Discovery using Delaunay Tessellation Stephen Capuzzi (University of North Carolina)
14	Colin Rinne	Octavio Paz's *Topoemas*: New Semantics in Contradictory Constellations Ivette Wilson (Modern Languages & Literatures)
16	William Robinson	American Toad Urination as a Predator Diversion Behavior Bradley Carlson (Biology)
18	Johnathan Rodriguez	Costume Designing *The Glass Menagerie* Andrea Bear & James Cherry (Theater)
20	Christopher Roman	The Portrayal of Radicalized Individuals in US Media Shamira Gelbman (Political Science)
22	Connor Smith & Jacob Alaniz	An Automated Method for the Correction of Unsubstantiated Ramachandran Outliers in Protein Structures Walter Novak (Chemisty)
24	Immanuel Sodipe	Counter Insurgency to Neoliberalism Sabrina Thomas (History)
26	Rodolfo Solis	Intergroup Interaction and its Effect on Public Opinion Concerning Immigration Policy Shamira Gelbman (Political Science)
28	Logan Taylor, Brandon Johnson, & Tim Leath	To Hell and Back: Odysseus, Elpenor, and the Underworld Bronwen Wickkiser (Classics)
30	Roarke Tollar & Nhan Nguyen	Characterization of the Catalytic Oxidation of Alcohols via Nickel and Cobalt Phosphine Complexes Charles Weiss (Chemistry)
32	David Vavrinak	Impact of Coating on Rate of in-vitro Degradation of Magnesium-based Stents Charles Weiss (Chemistry)

Oral Presentations (Alphabetical by Presenter)

Presenter: Zachary Anderson
Sponsor: James Cherry (Theater)
Title: The Importance of Performance in Combating Ableism

The inclusion of marginalized groups and voices in performance and theater has been at the crux of modern theater since the civil rights era. Many practitioners in the wake of civil rights movement brought forth initiatives to include people of all backgrounds into the world of theater as fellow practitioners and audience members. However, a group that has maintained only marginal inclusion until the last several years remains one of the largest groups of marginalized individuals in the world: the disability community. The accessibility of theater and training of practical theater skills has been largely inefficient and nonexistent for audiences and artists with a disability. "Inclusive theater" aims to include artists and audiences with disabilities into the fold of theater as equal participants through equity-based practices. This practical manual on how-to make inclusive theater attempts to help undergraduates (and those with a general interest) with implementing the equity-based practices into their academic institutions and local communities. The manual pulls from the recent history of inclusive and disability theater as well as my own professional experiences creating inclusive theater via my direction of *Spectrum* and my implementation of inclusive practices in *The Jungle Book*.

Presenter: Satchel Burton
Sponsor: Richard Warner (History)
Title: Reasons to Fight: Why *Nisei* Men and Women Decided to Fight for the US during World War II

When considering the courageous men and women of World War II, few reflect on the second generation Japanese Americans, the *Nisei*. Even though their story was one of repression, they still fought for victory. But how could they serve a country that discriminated against them? Determined to uncover the answer, my research took me across the late 19th century to the end of WWII. In this timeline of mass immigration, racial tensions, Americanization, and two great wars I was able to uncover their true story. Their journey was illuminated through news articles, military documents, journals, memoirs, and secondary historical sources. However, in order to understand these pieces of evidence, I was required to conduct a gender, cultural, social, and military historical analysis. After my analysis, it is apparent that the *Nisei* were motivated to fight for their country because they desired to prove their loyalty, lived in a culture that encouraged military service, and wanted to challenge various racial/cultural/gender barriers. These motivations spurred the *Nisei* to have one of the most decorated military careers in the history of America. By understanding this dynamic between duty, race, culture, and nation, we may be better able to fully recognize their sacrifices and victories.

Presenter: Jared Cottingham
Sponsor: James Cherry (Theater)
Title: *Do Not Resuscitate*

Documentary theatre is equally ambiguous as it is hotly disputed. Revolving around the use of primary sources and real life events within the dramatic world, documentary theatre receives great praise for its stylistic take on reality, and rejection for the ethical issues of utilizing real people and events. For my senior theatre thesis, I elected to tackle the current American healthcare system through a play utilizing the principles of documentary theatre. Twenty interviews were conducted from Crawfordsville and Indiana residents to portray the state of healthcare within the Midwest. The interviews were recorded via GarageBand, and utilized dialogue was transcribed. Many different age and occupational groups are represented through three actors, in order to give the field greater breadth and applicability. Additionally, to dramatically portray the ancient origins of Western healthcare and democracy, classical voices from Greek and modern texts are intermingled with the real-life dialogue in order to represent the flux between present systems and their origins. The play captures a period in time: a year removed from a contentious election, and in the thick of healthcare and tax overhaul. This presentation will focus largely on the creative process, and will include excerpts from the play itself.

Presenter: Darren DeRome
Sponsor: Matthew Carlson (Philosophy)
Title: Redefining Objectification in Videogames

In 2014 Anita Sarkeesian leveled the claim that videogames have a long history of objectifying women in efforts to be more appealing to the presumed "straight-white-male audience." Almost immediately this claim was heavily criticized in countless blog posts, online articles, and videos. While sifting through these reactions, it becomes clear that these critics often have a very different idea of what objectification is, even from article to article. Sarkeesian's definition is even different from the definition of Martha Nussbaum (author of *Objectification* 1995), although Sarkeesian adopts Nussbaum's ideas. Despite the inconsistency in definitions, Sarkeesian does bring up the compelling point that videogames have the capacity to objectify in ways that are unique and not found in other mediums, sometimes becoming more problematic because players may participate in the act of objectifying. However, Sarkeesian, and even Nussbaum, use the term 'objectification' somewhat inconsistently throughout their work. What I intend to do in this presentation is show that there is not actually one good definition of objectification, instead there are multiple, and clarify the ways in which videogames can objectify, pointing out what is unique to the medium in this regard.

Presenter: Simon Doughty
Sponsor: Agata Szczeszak-Brewer (English)
Title: A Case for Post-Postmodernism: Ironic Malfunctions in Zoë Wicomb's *David's Story*

A Case for Post-Postmodernism: Ironic Malfunctions in Zoë Wicomb's *David's Story*. When in the business of re-building a democracy, how does postmodern theory expand and restrict a society's capacity to approximate justice? That is—how might one get away with equality-based justice (rather than equity-based justice) when the past continually demands reparations? How might we explore answers to such questions through the pragmatic exploration that a novel has to offer? I asked these questions of Zoë Wicomb's postmodern novel—*David's Story*—which focuses on South Africa at the dawn of its post-colonial existence. I found that the novel's postmodern irony functionally ironizes itself because of Wicomb's failure to consider meta-irony, South Africa's volatile and politically-charged etymology, and the power of reconciliation and empathy made possible through other theoretical frameworks such as post-postmodernism. This paper uses postmodern rhetoric to recognize the specific struggles of post-apartheid South Africa and then to extrapolate its universal lessons to America, as our nation tries heal from a deeply racist past and persistently racist present.

Presenter: Anthony Eley
Sponsor: Sabrina Thomas (History)
Title: Pompey vs. the Cilician Pirates: More than just a Naval Campaign

This presentation takes an in-depth look at one of the earliest campaigns against pirates in history, Pompey the Great's campaign against the Cilician pirates in 67 B.C.E. Besides being one of the earliest campaigns against the pirates; this campaign took place during one of the most tumultuous times in Roman history. What my paper argued was that this campaign was more than a militaristic campaign to defeat the pirates. This campaign was instead one that took place during a series of civil wars that eventually lead to the fall of the Roman republic, a time when the city was being primarily fed by grain shipped from outside of Italy, and in the midst of Pompey trying to gain power to increase his political standing. This context of the campaign adds importance to it and is essential in how the campaign unfolded. Additionally, the results of this campaign had far reaching effects on the Roman world. Examining this context and impact of the campaign are what this presentation is over.

Presenter: Arthur Equihua
Sponsor: Jill Rogers (Global Health Initiative)
Title: Menacing Mosquitos - Vector Control at the Montgomery County Health Department

Year after year, mosquitoes infect and kill millions of people throughout the world by carrying and spreading diseases. The World Health Organization describes mosquitos as one of the deadliest animals in the world. Their methods of feeding and their adaptability to the environment make these insects a serious health concern to many communities. Luckily, there are two effective ways humans can combat these awful pests: experimental manipulation and daily life changes. However, experimental procedures on mosquitoes can be expensive and take longer to implement. Therefore, the quicker and cheaper option is to implement public health campaigns to reduce the mosquito population and mosquito bites. This past summer, I worked as an Intern at the Montgomery County Health Department, and I helped collect over 2500 mosquitos from 31 different locations in Montgomery County. I also helped create public service announcements and promotions designed to help educate the public on the ways they could directly lower the mosquito biting rate in their area. Through this opportunity, I will share the most effective mosquito reducing strategies, some of which can be implemented in every community all over the world.

Presenters: Samuel Gellen & Nolan Morse
Sponsor: Roland Morin (Professional Development & Center for Innovation, Business, and Entrepreneurship)
Title: A Data Driven Approach to Tax Audit: Synapse Data Analytics

Between a variety of local initiatives and often smaller tax bases, budgets historically have been extraordinarily tight for municipal governments. One of the biggest concerns for these communities then, is ensuring they are collecting all of the tax money they are owed. When the City of Crawfordsville approached the Wabash College Center for Innovation, Business, and Entrepreneurship (CIBE), they knew that there was a problem with Indiana Homestead Tax Exemption fraud within the city. The CIBE team developed a data driven, empirical approach to uncovering potential offenders using a variety of different public data sources. They uncovered throughout the process that the degree of Homestead fraud occurring within the city was much larger and more systemic than had been imagined, uncovering $6.8MM of recoverable tax dollars. The software that was developed in this project has since been spun off into an independent company, Synapse Data Analytics, who are now making this solution available to communities across the state.

Presenter: Christian Gosser
Sponsor: James Makubuya (Music)
Title: Celtic Music: The Culture that Never Died

To many people, the phrase Celtic culture can be understood as traditional Irish music and customs. However, Irish culture can be described as the "tip of the iceberg" when talking about Celtic culture. The latter is inclusive of many ethnic groups like the Scots, the Welsh, and many more. With all of the ethnic groups within the Irish culture, each group has their own music and customs that shape their identity. This presentation will begin by summarily identifying and discussing the six main Celtic groups, some of the music that has been performed, and the different types of music. In addition, how the Celtic music is played will also be discussed. Furthermore, in this presentation, my research will show how the combination of all of these traits and how Celtic music and culture has never actually died, but still lives on in today's society.

Presenter: Brient Hicks
Sponsor: Brian Tucker (Modern Languages & Literatures)
Title: A Critical Analysis of *The Reader* (*Der Vorleser*): *Vergangenheitsbewältigung* Literature

Bernhard Schlink's *The Reader* (*Der Vorleser*) is a critically acclaimed novel written in post-war Germany with *Vergangenheitsbewältigung* as the main thematic concern, and is taught in most high schools in Germany. *The Reader* attempts to address literary themes such as guilt, shame, victimization, and moral condemnation. This presentation will analyze Bernhard Schlink's book *The Reader*. *Vergangenheitsbewältigung* literature attempts to analyze, digest and learn to live with the past, in particular, the Holocaust. In this analysis, I will discuss the problems of fictional representations of the Holocaust in Schlink's book with an emphasis put on Schlink's portrayal of Hanna and subsequent representation of Jews.

Presenter: Patrick Jahnke
Sponsor: Eric Freeze (English)
Title: *Click*

In this short story about friendship, death, and the power of images, a young photographer takes an elderly, blind man on walks throughout the town, until one day he sees something that changes his life forever. This story was written for ENG312 and was published in the Spring 2017 edition of *Adelaide Literary Magazine.*

Presenter: Adam Kashin
Sponsors: Michelle Rhoades & Richard Warner (History)
Title: Rereading Lady Mary Wortley Montagu: Challenging Said's *Orientalism* with Cultural Immersion and Diffusion

While the study of Lady Mary Wortley Montagu and her work is not new, there is no consistent manner of understanding her character and proper contributions to academia. As others have demonstrated, it is a valid course of action to analyze her work with Edward Said's *Orientalism*, in an effort to understand her actual influence on the Western World. This study seeks to use cultural history as well as gender history to expose the true influence and character of Montagu as contained in her complete written letters, with particular attention to the infamous Turkish Letters. It is clear that academics of all veins are unsure of where to place Montagu and how to interpret her work and socio-historical position, so it is beneficial to examine her work as challenging the firmly constructed divide between the Eastern and Western worlds.

Presenter: Jack Kellerman
Sponsor: Lorraine McCrary (Political Science)
Title: The American Democracy-Technocracy Dilemma

The role of a specialized expert in a democracy has been debated since democracy's inception. Plato wrote about a form of government that was ruled by the skilled (*techne-kratia*), moral experts rather than the public (*dim-kratia).* As modern states, economies, and sciences developed, so too did the role of technical experts. Today, experts exert considerable influence in policy decisions in healthcare, education, social work, crime control as well as in government agencies such as the Environmental Protection Agency and Food and Drug Administration. The development of the "American Technocracy" and its relationship with "American Democracy" has been long debated by scholars and is the starting point for this paper. After reviewing the relevant scholarly literature and analyzing Munchhausen Syndrome by Proxy in the legal field as a Case Study for the tension between technocratic and democratic approaches, I argue that a deliberative system between technocrats is needed for situations that call for highly technical knowledge with ambiguous and complexity issues that ultimately have a profound impact on the lives of others. This paper urges future scholars to look into a new relationship between democracy and technocracy, that is, combining the two within one entity rather than have two parties represent the two schools of thought.

Presenter: Jack Kellerman
Sponsors: Jennifer Abbott & Todd McDorman (Rhetoric)
Title: "The People's" Champion: Trump Scapegoating Politicians

Donald Trump has been highly scrutinized by the media and scholars alike in his 2016 presidential campaign. With such special attention to his "misogynistic" and "divisive" rhetoric, it is surprising that rhetoric scholars have not yet analyzed his Inaugural Address, a genre in itself that has had significant scholarly attention. Drawing from Michael McGee's notion of "The People" and Kenneth Burke's theory of scapegoating within the guilt-redemption cycle, I argue Donald Trump framed his election as the purification needed to alleviate the guilt his voter base felt due to economic depression. President Trump accomplishes this by a series of rhetoric moves. First, Trump rhetorically positions himself as the champion of "The People" by offering a political myth. More specifically, this political myth explains why the people have felt guilt from an economic depression. Further, this myth blames politicians by scapegoating them as the other, and thus explaining "The People's" economic issues. Ultimately, Trump places his ascendency as the redemption needed to alleviate the aforementioned guilt. Further, I argue that the inaugural address, while a well-defined genre, is permeable enough for a President to mold his or her unique style to the speech's generic expectations.

Presenters: James Kirkland, Eric Lakomek, Amadeo Rosales, & Shane Taylor
Sponsor: Ann Taylor (Chemistry)
Title: Quantitative Analysis of Copper Concentration in Wabash College Water Samples

Is the water you consume from popular spots on campus beneficial to your health? The primary goal of our experiment was to use quantitative methods to obtain an accurate reading of the amount of copper in the water many of us consume. Samples from across campus were collected and tested for copper content with atomic absorbance spectroscopy. Based on the action levels set by the EPA, some locations have more copper than is recommended. In the future, we hope to perform more measurements to determine the corrosivity of the water and look at the copper concentration in a single location over time.

Presenter: Erich Lange
Sponsor: Brian Tucker (Modern Languages and Literatures)
Title: Political Activism as a Component of Religious Commitment: Reflections from a Nazi Prison

This past summer, our country saw white supremacists, ultranationalists, and neo-Nazis march publicly through our country's streets—even maliciously driving a car into a group of protestors. This resurgence of extremist ideals and the "Alt-Right" Movement echoes that of Nazi Germany throughout the 1930s and 40s. Hoping to not let history repeat itself, we look to the past for solutions for our present problems. Dietrich Bonhoeffer—Lutheran pastor, theologian, double-agent, and anti-Nazi dissident—publicly and secretly endeavored to challenge and subvert the Nazi regime, for which he was eventually hanged. However, part of Bonhoeffer's political activism acknowledges an inherent religious element. In a "world come of age," Dietrich Bonhoeffer and his Letters and Papers from Prison give us insight into how to fight for peace and social justice in a society where violence and injustice abound.

Presenter: Minh Quan Le Thien
Sponsor: Dennis Krause (Physics)
Title: Neutrino Flavor Mixing with Dirac Equation

We examine neutrino oscillation as a kinematics phenomenon, arising from the superposition of different mass eigenstates of the Dirac Hamiltonian. Using a Relativistic Quantum Mechanical approach, we show that "the exact formula of neutrino oscillation" in the Quantum Field Theory can be derived purely from the first quantization principles, which was done partially previously. Particularly, an analogous procedure to the field-theoretic calculation in the context of relativistic quantum mechanics is constructed for general situations of mixing fermions, which avoids the controversial construction of the non-perturbative S-matrix in the quantum field-theoretic approaches. Furthermore, we also study how different initial production state of neutrino affects the neutrino oscillation in experiments. Our results provides insights into the physical nature of neutrino mass, as well as possible new signals for experimentalists to look for in neutrino oscillation experiments.

Presenter: Tyler Mix
Sponsor: Dennis Krause (Physics)
Title: Modeling Halo Nuclei With a Spherical Potential Well

Neutron halos are the phenomenon where a neutron or pair of neutrons are outside of their nucleus and are weakly bound. This is a consequence of neutron rich isotopes near the neutron dripline that is lacking an accessible undergraduate model of behavior. The model presented here uses a spherical finite well to exhibit the behavior inside the nucleus with the idea that the binding potential is pulled out at the radius to examine how the particle behaves outside freely. Position and momentum space representations in 3D have been achieved and qualitatively agree with the behavior that is desired regarding halo nuclei.

Presenter: Nathan Muha
Sponsor: James Cherry (Theater)
Title: Translating Memory: The Midwestern Opera Project

This presentation will follow the development and describe the guiding principles of Nathan Muha's operatic adaptation of Arthur Miller's play *A Memory of Two Mondays*. This semi-autobiographical play is set in the 1930s in Brooklyn, NY, and follows a young man, Bert, on the verge of leaving his co-workers in an auto-supply warehouse for the pursuit of higher education. Bert expects it to be a difficult transition, however he doesn't expect to face the criticisms and resentment of his co-workers because of that transition. The prospect of an operatic adaptation presented unique challenges and opportunities to the composer/librettist that led to equally unique solutions. These solutions culminated in specific aesthetic guiding principles both musical and textual, including modernizing and relocating the text to 2015-2016 Midwest America and incorporating both minimalism and electronic sampling into the soundscape. The composer/librettist will discuss his process and these decisions, and how adaptation works as translation within the work.

Presenter: Oliver Page
Sponsor: Crystal Benedicks (English)
Title: The Painful Relevancy of Elizabeth Barrett Browning's *The Runaway Slave*

Is 19th century poetry relevant to today's issues? An examination of Elizabeth Barrett Browning's *The Runaway Slave* would deliver an affirmative answer to this question. This is evident in two of the poem's central themes: the hypocrisy of making freedom in America exclusive to privilege and the intersection of religion and progress. This examination of Browning's poem is painfully pertinent because of how both central themes have remained relevant, yet evolved significantly since the 19th century. On the one hand, territorial attitudes towards immigrants still exist, particularly in America's most recent wave of nationalistic politics. On the other hand, Browning's poem illuminates a marriage of social forces—religion and liberal values—that seem irreconcilable today.

Presenter: Braden Quackenbush
Sponsor: Ivette Wilson (Modern Languages & Literatures)
Title: Liberty in Federico García Lorca's *La casa de Bernarda Alba*

Completed at the dawn of the Spanish Civil War, Federico García Lorca's *La casa de Bernarda Alba* serves as a commentary on liberty in Spanish society during one of its pivotal moments. Lorca's play presents an all-female cast in what can certainly be viewed as a feminist allegory for the dangers of restrictive societal institutions. The play says quite a bit about Spain, but also communicates a universal, timeless message about how societal values and expectations can limit personal freedom. I look into Lorca's use of metaphors and literary symbols, as well as the influence of Gypsy culture during his childhood in southern Spain, in order to detect subliminal messages about liberty. I also analyze how Lorca's simple stage directions and instructions provide creative freedom for the director to present the work in a new way each time it is produced for the stage.

Presenter: Colin Rinne
Sponsor: Natalie Aikens (English)
Title: Reflections of Authorial Privilege in Anti-imperialist Satires

Edward W. Said has suggested that narratives stage and even decide many cultural battles for control, especially so in the context of imperialism. Complicating these battles is the imposed power structures of imperialism: how do subjugated authors respond to imperialism. How does the disparity in responses from non-marginalized allies delineate the implications of imposing imperialist power structures between authors and their audiences? To investigate this, we look to Puerto Rico: once a jewel in the US imperial crown, one that native Puerto Rican author Rosario Ferré fought for in both Spanish and English alongside one of the US's literary greats, Mark Twain. While each of these authors employed satire to undermine imperial power structures, Twain's positional privilege in the matrix of imperialism provided him more freedom to critique his own country. Moreover, Ferré's Maldito amor's harsh Spanish sardonicism shifts to a much subtler approach in her own translation to English-speaking audiences. And so, while narrative may in part decide cultural control, for authors of disadvantaged positions it is a decidedly unfair battleground.

Presenter: Christopher Szostek
Sponsor: Jessica Mills (Theater)
Title: The Untold Stories of Disney World: Disney's Morality Called into Question

The Walt Disney World Parks and Resorts have always marketed themselves as moral, altruistic, magical, and innocent. This strategy is effective from a business standpoint. However, Disney is not quite so pleasant behind the scenes. I spent a year Working at Walt Disney World in Orlando, FL. In the time I was gone I witnessed and encountered many events that led to me questioning the overall integrity of the Walt Disney Company. I began investigating further into many of Disney's business practices through interviews and conversations with other Cast Members. These discussions served to help me form more critical opinions and uncover the darker side of Disney that is not publicly known. The concept began with a way to craft a narrative highlighting critical moments in my time as a Cast Member. The interviews led to me uncovering even more information than I was expecting. This presentation serves to provide insight into my artistic process, and the journey that I embarked on when deciding to leave Wabash for a year to intern in "The Happiest Place On Earth."

Presenter: Dajon Thomas
Sponsor: Elizabeth Morton (Art)
Title: Traditions in African Art; Installation at MXI

"Although their origins are often shrouded in mystery, traditions have played a crucial role in defining communities and peoples. For most Africans, community is defined and strengthened through spirituality, knowledge, and continued reinforcement of shared values and culture." Tradition, a word that has come to encompass the very meaning of being a "Wabash Man," has for centuries defined the roles and meaning many individuals seek in life providing them with a sense of being. This sense of being that arises from Tradition is just as much spiritual as it is practical for these African Communities, ensuring their continued way of existence for many generations to come. Throughout the semester the MXI African Art collection has had a complete revamping, showcasing new works of art and providing even more well-studied information on the relevance of Tradition in African cultures. Alongside my partner Marlon Lewis, the entire exhibit was planned, developed, and installed. Through centralizing all of the artwork on the second floor, the MXI is now able to provide a more complete Museum experience.

Presenter: David Vavrinak
Sponsor: Charles Weiss (Chemistry)
Title: Ramachandran Outliers: Data Mining and Analysis Using the Python Language

Due to calculation errors in published X-ray crystallographic models, favorable amino acids are often misconstrued as Ramachandran outliers. To resolve this issue, the Python programming language is used to compile data on over seven thousand high quality X-ray protein crystal structures. A script was created to iterate through each file and extract relevant data that may provide insight concerning Ramachandran outlier trends. The data collected indicates that certain amino acids are more prevalent as outliers than others. Further analysis reveals that residue size and side chain polarity may be valuable in predicting Ramachandran outliers. Plots that compare each feature support this finding, and incremental principle component analysis (PCA), a linear dimensionality reduction technique, suggests other trends may exist when taking into account multiple features of the protein and residues.

Presenter: Aaron Webb
Sponsor: Crystal Benedicks (English)
Title: *Sundering Sounds*: Tonality, Volume, and Lord Alfred Tennyson's Grief

Grief cripples our mind and soul and has the power to render us unable to recognize who we are or the world surrounding us. Lord Alfred Tennyson lost his best friend, Arthur Hallam, in 1833 and chronicled the intense grief he felt in response in In Memoriam A.H.H. In Memoriam A.H.H. provides an intimate and personal account of grief and its profound effects on the human psyche and reality. *Sundering Sounds* investigates Tennyson's ever-changing grief through analyzing his use of bells and their characteristics. The essay seeks to account for the relationship between sensing our external reality and that sensation's direct effect on what we think and feel. The essay delves into grief, its effects, and the promise of overcoming one of our most powerful and unfortunate emotions.

Presenter: Christopher Wilson
Sponsor: Heidi Walsh (Biology)
Title: Palmitic Acid Induces ER Stress in Hypothalamic Neurons: Implications for Obesity and Infertility

As high fat and high sugar foods and sedentary lifestyles have become more prevalent in modern society, obesity has become a health crisis. While most people are familiar with the major physical problems that are caused by obesity, obesity can also lead to complications on a molecular level. Circulating free fatty acids in an obese individual can cause misfolding of proteins in the endoplasmic reticulum (ER). This ER stress can initiate the unfolded protein response (UPR), a cellular mechanism that resolves the misfolded proteins. Previous research has shown that ER stress in mice hypothalamic neurons can change the expression of gonadotropin-releasing hormone (GnRH). GnRH controls the release of follicle-stimulating hormone and luteinizing hormone, two hormones involved in the formation and development of sex cells. We investigated the impact of palmitic acid on ER stress and GnRH production in immortalized mice hypothalamus neurons in culture. We also showed that palmitic acid can cause neural inflammation and investigated the possible molecular pathway. The results of our experiments indicate a link between obesity and infertility through changes in gene expression.

Presenter: Christian Wirtz
Sponsor: Jennifer Abbott (Rhetoric)
Title: Carly Fiorina's *Faces* Campaign Advertisement: Resisting the Political Status Quo

Every election brings with it its fair share of mudslinging and ad hominem attacks and the 2016 election was certainly not an exception. When Donald Trump's no-filter approach led to relentless criticisms of other Republicans seeking nomination, Carly Fiorina was not spared. When Trump criticized her face in a Rolling Stone interview, Fiorina had two options: either remain silent or fight back. Fiorina chose the latter and only three days after Trump's comments, Fiorina's campaign published *Faces*. The video was lauded as one of the most notable and memorable ads of the 2016 campaign; this investigation will ask why and pursue the answer. This presentation will analyze *Faces* through the use of visual rhetoric and critical rhetoric in that pursuit. By analyzing what the video does in its message and visuals, we will see how it resists a dominant ideology in America's democracy.

Poster Presentations (Listed by Poster Number)

Poster #1
Presenter: Miguel Aguirre
Sponsor: Bradley Carlson (Biology)
Title: Determining the Signal Detection Range of Acoustic Sensors in Open Coastal Habitats

Acoustic monitoring is an emerging animal monitoring technique that utilizes recordings to determine population densities and presence of animals. Although song meters have been improving their quality of recording audio, various environmental factors affect sound propagation which makes it difficult to determine their surveying range. By deploying song meters at varying distances from a sound source in the Younger Lagoon Reserve in Santa Cruz, CA and using programming software, the Conservation Metrics team and I were able to determine that each song meter had a 50m radius detecting range in open coastal habitats for tones at 5kh. This finding was essential for use in remote monitoring ashy storm-petrel, currently classified as endangered by the International Union for Conservation of Network (IUCN), because they live in coastal California and their bird calls are at approximately 5kh.

Poster #2
Presenters: Nigel Dao, T.J. Kilbourne, & Zane White
Sponsor: Robert Horton (Psychology)
Title: Exploring the Moral Foundations of Immoral Personality Traits

Moral Foundations Theory, proposed by Graham et al. (2011), posits that morality is an adaptive tool from evolution that helps human function properly and efficiently as a socially-inclined species. The theory describes five dimensions of moral reasoning, dimensions that people use when making decisions about how "moral" is a particular behavior. These dimensions are Care, Fairness, Loyalty, Authority and Sanctity. The current study investigated how these moral foundations linked to the Dark Triad personality traits: psychopathy, machiavellianism and narcissism. One hundred and twenty-five participants (33 females, age 18-66) completed the Moral Foundation Questionnaire (MFQ30), the Short Dark Triad (SD3) questionnaire, and the Pathological Narcissism Inventory (PNI). Hierarchical regression analyses revealed a number of unique associations between the personality traits and the moral foundations. For instance, higher levels of psychopathy were uniquely associated with lower levels of all five moral foundations, whereas higher levels of narcissism predicted higher levels of two foundations: loyalty and authority. Interestingly, narcissistic grandiosity and vulnerability were similar in their patterns of association with the Moral Foundations. The relevance of these findings for Moral Foundations Theory and for our understanding of the Dark Triad traits is discussed, and additional research initiatives are recommended.

Poster #3
Presenters: Joseph Ballard & Hunter Jones
Sponsor: Erika Sorensen-Kamakian (Biology)
Title: Investigation of New Notch Target Genes in Stem Cell Maintenance

The *C. elegans* roundworm is a powerful genetic model used to study genes important in human biology and disease because ~38% of worm genes have human orthologs and most components in known signaling pathways are conserved. *C. elegans* exists primarily as a self-fertilizing hermaphrodite; therefore, the germline (the lineage of cells responsible for producing gametes) generates both oocytes and sperm. The germline maintains a population of germline stem cells (GSCs) in order to create a continuous supply of gametes that can give rise to a new animal. Stem cells are undifferentiated, have the capacity to self-renew, and are totipotent (capable of giving rise to all cell types). In *C. elegans*, the conserved Notch signaling pathway functions to maintain GSCs in a totipotent state and is the only known pathway known to do so. While much research has been done to discover the mechanisms of the Notch signaling pathway, a large question remains unanswered; which Notch target genes are used to control self-renewal, totipotency and differentiation? Specifically, we want to determine if lst-4, ccar-1, mcm-6, and csr-1 are important for GSC maintenance using in situ hybridization and RNAi gene depletion.

Poster #4
Presenter: Charles Mettler
Sponsor: Amanda Ingram (Biology)
Title: Root, Fungal, and Microbial Biomass Spatial Distribution in the Fungal Loop Hypothesis

Arid ecosystems are often characterized by low C, N, and soil organic matter (SOM), reducing nutrient availability to plants. Although only recently recognized as such, the most important nutrient input to these systems comes from biological soil crusts (biocrusts). Biocrusts are clustered communities of autotrophic and heterotrophic bacteria, fungi, and lichens concentrated in the top 5 cm of soil. Most notably, they are capable of C and N fixation. The fungal loop hypothesis asserts that fungal hyphae in desert ecosystems serve as conduits between plants and biocrusts, by translocating N to plants (from biocrusts) and C (from plants) to biocrusts. Although the hypothesis has gained some direct support, efforts are underway to determine its validity and whether transport is occurring via direct root absorption from biocrusts. The hypothesis predicts that roots are excluded from the top 0-5 cm of soil. Fungi should form a network, i.e., an "everywhere" distribution, and microbes should be mostly confined to the shallowest depths. In the present study, these predictions were tested and confirmed by determining biomass distribution around a plant species of interest. Taken together, this result represents circumstantial evidence for the fungal loop hypothesis.

Poster #5
Presenter: AJ Belden
Sponsor: Bradley Carlson (Biology)
Title: Box Turtle Boldness: Responses to Simulated Predator vs. Confinement Assays

This study investigated personality differences within fear/stress responses of eastern box turtles in order to see whether proactive (bold) and reactive (shy) behaviors are correlated across different contexts. We hypothesized that (1) context will change average turtle boldness, (2) bolder turtles will remain relatively bolder than shy turtles when the context is changed, and (3) different measures of boldness will be correlated. We employed a confinement assay (bag test) and a simulated predator assay (puppet test) in which both head emergence and movement times were measured to identify proactive/reactive behavior exhibited towards stressful stimuli. Box turtles responded to the puppet test as more threatening than the bag test, representing a change in average turtle boldness. However, the time the turtles spent in their shell was positively correlated between the bag and puppet tests, suggesting boldness and shyness are not context-specific traits. Further, the use of defensive behaviors was correlated with boldness, supporting the use of either test. The findings represent evidence that proactive/reactive behaviors within eastern box turtles are consistent across contexts. Implications for this behavioral syndrome can help explain non-adaptive behaviors (e.g., boldness) in various contexts.

Poster #6
Presenter: Zachary Patton
Sponsor: Eric Olofson (Psychology)
Title: Investigating a Relationship Between Maturity and Responsibility

This study explores a possible relationship between psychosocial maturity (PSM) and responsibility. PSM is a method of describing how capable one is to meet society's goals. It was measured before and after a camp counselor or average summer internship experience. I predicted that counselors would experience a greater increase in PSM as a result of being forced to be more responsible than non-counselors. However, there was no significant relationship observed between PSM and maturity in this study. The paper will discuss necessary improvements and directions for future research.

Poster #7
Presenter: Bryce Bridgewater
Sponsor: Patrick Burton (Biology)
Title: Cellular Proliferation in Regeneration of *Nematostella vectensis*

Nematostella vectensis is capable of complete bidirectional regeneration. The oral pole contains a mouth, pharynx, and tentacles while the aboral half contains the physa of the animal. Based on Passamaneck and Martindale (2012), the oral pole of the animal requires cell proliferation to regenerate in juvenile polyps. We investigated this in mature adults by exposing *Nematostella* to Alsterpaulone (ALS) and AraC, which promotes and prevents cell proliferation, respectively. We wanted to see if the animals could regenerate a head with cell proliferation blocked. In contrast to Passamaneck and Martindale (2012), our study showed that the animals could regenerate a mouth and pharynx while cell proliferation is blocked. Tentacles were the only part of the oral pole that was not able to form, showing that tentacles required proliferation, not the pharynx and mouth.

Poster #8
Presenter: Joe Pich
Sponsor: Bradley Carlson (Biology)
Title: GPS Tracking of Box Turtles using Arduino Circuits

Tracking turtle movements is an important tool and form of data collection in determining turtle behavior and ecology. Using GPS units to track turtle movements is the ideal method for accurate tracking, but the cost of GPS technology is expensive and has a number of drawbacks. In order to combat these limitations, GPS units were constructed from Arduino circuits, an open source microcontroller and programming system that utilizes simple hardware and software. After the construction and deployment of the units, the data returned minimal results for a number of possible reasons, but did provide some preliminary data. With some improvements in design and packaging, Arduino units do show promise in becoming effective ways to collect GPS telemetry data inexpensively and effectively.

Poster #9
Presenter: Tung Bui
Sponsor: Neil Schmitzer-Torbert (Psychology)
Title: Would Attributions Help to Alleviate the Envious Emotion?

We hypothesize that when a person attributes a friend's superior performance to the friend's advantages or his/her own disadvantages, he/she would feel less envious of the friend. To induce envy, Study 1 had subjects write a letter describing a memory in which a friend outperformed them. In Study 2, subjects completed the same envy induction, then listed their friend's advantages over them or their disadvantages relative to the friend. A regression analysis revealed that attributing a friend's superior performance to his/her advantages increased envy, and that describing one's own disadvantages did not affect envy. In Study 3, subjects indicated how much they agree/disagree with the statements: (1) the friend has advantageous social resources (i.e., situational) and (2) the friend has advantageous personality (i.e., dispositional). Contrary to our hypothesis, the more subjects disagreed with the situational attributions, the less they felt envious. However, subjects might have disagreed (a) to feel less "guilty" for being so envious, or (b) because the statements did not speak to their comparison domains. Future studies may control for such motives behind disagreeing.

Poster #10
Presenters: Alex Pittsford, Connor Smith, & Nick Etter
Sponsor: Paul Schmitt (Chemistry)
Title: Analysis of Trace Crystallinity in Amorphous Drug Formulations by Triboluminescence

Triboluminescence was used to measure trace crystallinity in model solid state pharmaceutical dispersions, an emerging formulation technology to improve the stability and efficacy of poorly water soluble drug products. The method was found to have a limit of detection of approximately 10 ppm on solid mixtures of griseofulvin in polyvinylpyrrolidone (PVP). Spin-coating, a method in which a solution of drug and polymer are placed on a substrate and spun at a high rate (~1000 rpm) to facilitate rapid evaporation of solvent, was used to create model amorphous formulations. While more testing needs to be done, preliminary results suggest that spin-coating creates amorphous formulations on the order of 50 times less crystalline than rotary evaporation, a common laboratory-scale process for mimicking industrial amorphization. Additionally, the impulse-dependent decay of triboluminescence was investigated as a means to quantify mean particle size, with preliminary results suggesting feasibility. Overall, these results suggest that these new methods of amorphous drug formulation and detection could allow for improved formulations in the future, increasing the effectiveness and shelf-life of new pharmaceuticals.

Poster #11
Presenter: Sergio-Steven Cobos
Sponsor: Walter Novak (Chemistry)
Title: Synthesis of C2'epiAmB: A Possibly More Potent, Less Toxic Antifungal Derivative of AmB

Amphotericin B is a clinically approved drug that is utilized to treat life threatening fungal infections. However, the downside to using AmB is that it will bind to the sterol of human cholesterol almost as readily as it will to the ergosterol in fungi. Research performed in the past has uncovered that the mycosamine appendage of AmB is responsible for promoting the binding of AmB to egosterol and cholesterol. More specifically, it has been found that the C2' carbon of AmB is mainly responsible for this binding. Therefore, altering the substituent at the C2' and, thereby, synthesizing C2'epiAmB should cause for a more potent and less toxic antifungal derivative of AmB, which was the primary goal of this internship.

Poster #12
Presenter: Andrew Puente
Sponsor: Stephen Capuzzi (University of North Carolina)
Title: Expediting Protein-Ligand Docking Techniques for Drug Discovery using Delaunay Tessellation

Virtual Screening of large chemical libraries allows for the identification of novel compounds for drug targets. The ability to accurately and rapidly filter these large chemical libraries allows researchers to focus on computationally demanding techniques to design or repurpose ligands for targets. This project focuses on the use of computational geometry to generate 3D tessellations that can describe the geometric interactions that take place at the binding site of a protein-ligand complex. These protein-ligand complexes are scored based on their available activity data and used to develop statistical models to predict binding affinity. This research was done at the University of North Carolina – Chapel Hill.

Poster #13
Presenter: Cody Cochran
Sponsor: James Brown (Physics)
Title: Timing and Position Calibration of the Modular Neutron Array

During the summer of 2017, I worked with Professor Jim Brown as a nuclear physics research intern. Professor Brown is a part of a collaboration of undergraduate institutions that conduct experiments at Michigan State's National Superconducting Cyclotron Laboratory (NSCL) in order to determine the properties of rare isotopes. The collaboration specifically uses the Modular Neutron Array (MoNA), an array of scintillator bars that emit light when stuck by neutrons ejected from the nuclei of the isotopes as they decay, to collect experiment data. ROOT is a data analysis software developed by CERN specifically for dealing with data from particle physics experiments. During the summer and into the fall semester of 2017, I worked with Professor Brown to analyze and manipulate the experiment data in useful ways using ROOT. Specifically, my work dealt with the calibration of the timing and positioning of the particles as they strike the array. In my presentation, I will explain and graphically display the steps of the data analysis process and how they relate to the experiments conducted at the NSCL.

Poster #14
Presenter: Colin Rinne
Sponsor: Ivette Wilson (Modern Languages & Literatures)
Title: Octavio Paz's *Topoemas*: New Semantics in Contradictory Constellationsy

Octavio Paz is undoubtedly a literary monolith of the Spanish-speaking world and at large. From 1967-71, he published some of his most experimental works, culminating in the publication of *Topoemas*. This collection of six synesthetic, contradictory, concrete poems creates new semantic meaning in, of, and just as often, against its own parts. In their minimalism, the topoemas transcend the physical page to undermine their own order. In doing so, they are what Julia Kristeva describes as a black sun: that which gives light while simultaneously subsuming it, or a whole note in music with meaning from the "nothing." At times, Paz weaves oriental religious concepts into Mesoamerican imagery, or simply creates his own increasingly contradictory language to achieve new meanings of expression.

Poster #15
Presenter: Nigel Dao
Sponsor: Heidi Walsh (Biology)
Title: Estrogen Influences Astrocyte Density in Forebrain Circumventricular Organs of Ovariectomized Rats Following Polyethylene Glycol-induced Hypovolemia

Estrogen is involved in the central regulation of body fluid volume and osmotic balance, partly by acting at the circumventricular organs of the hypothalamus, which detect the humoral signals associated with body fluid challenges. The current study investigated the influence of estrogen on the density of astrocytes that make up the incomplete blood-brain barrier of these neural sites and aid in the detection of body fluid and osmotic changes following blood volume depletion. 24 adult female rats were ovariectomized (OVX) then injected with estradiol benzoate (EB; 10 μg/0.1 ml oil) or the oil vehicle (OIL; 0.1 ml) for two consecutive days. Rats were later injected subcutaneously with polyethylene glycol in 0.15M NaCl (PEG; 100 mL/100g body weight) to induce hypovolemia or 0.15M NaCl (ISO). Brain sections of the subfornical organ (SFO) and organum vasculosum of the lamina terminalis (OVLT) were immunostained with fluorescent anti-glial fibrillary acidic protein (GFAP) and anti-c-Fos antibodies. Our data suggest that estrogen increases astrocyte density in these areas, which could facilitate neuronal-glial signaling to enhance physiological response to fluid imbalance. Estrogen however did not affect hypovolemia-induced neuronal activation, as indicated by Fos immunoreactivity. Additionally, astrocytes in estrogen- and PEG-treated rats retracted their processes from the neuronal soma adjacent to the ventricles. This was not observed in oil- and PEG-treated rats. Estrogen hence appears to act primarily at the astrocytes, instead of neurons, of the forebrain circumventricular organs following hypovolemia.

Poster #16
Presenter: William Robinson
Sponsor: Bradley Carlson (Biology)
Title: American Toad Urination as a Predator Diversion Behavior

Interactions between predators and prey are a fundamental and often poorly understood aspect of community ecology. Because of the key ecological impact of predator prey interactions, diverse types of antipredator defenses have evolved in animals, and amphibians exemplify this diversity. Notably, many anurans (frogs and toads) respond to the approach of, or handling by, predators or humans with a urination reflex. Toad urination has been poorly researched in the past, as such it was our goal to explore what advantages urination might provide a toad. To this end we collected toads from the field and stored their urine. We used this urine, along with deer urine, water, toad skin, mouse skin, and strawberry extract to test interest responses in hognose snakes, a specialist predator of toads. We measured tongue flicks and bite latency over a period of 60 seconds per snake 4 times a day for 2 weeks as a metric of interest. We found that toad urine elicits a higher response than water, though toad and mouse skin both elicited a much higher response. As such, it is possible that toad urine acts as a diversion, as its attractive qualities could confuse attacking snakes.

Poster #17
Presenters: Benjamin Geier, Hunter Jones, & Joseph Ballard
Sponsor: Erika Sorensen-Kamakian (Biology)
Title: Loss of microRNAs mir61-250 Results in Notch Loss of Function Phenotypes in Somatic and Germline Tissues

Notch signaling regulates stem cells and differentiation during normal animal development and when dysregulated can lead to cancer. In the model organism *C. elegans*, Notch signaling functions to maintain germline stem cells (GSCs) in a totipotent state (capable of differentiating into all cell types) by promoting the expression of target genes that function in GSC maintenance. Recently, microRNAs (miRNAs) mir-61 and mir-250, termed collectively mir61-250, were identified as Notch target genes in GSCs. miRNAs are non-coding RNAs that act post-transcriptionally to limit the expression of other genes. To ask if mir61-250 affects GSC maintenance, we performed assays using a CRISPR-Cas9 generated mutant, which lacks the mir61-250 promoter. Unfortunately, no GSC defect was observed. This lack of defect is consistent with previous reports where many single-gene miRNA deletions do not produce strong mutant phenotypes unless placed in a sensitized background. Progressing forward, our lab has placed mir61-250 mutant animals in sensitized backgrounds and assayed them for defects in animal development, GSCs, and fertility. We find that mir61-250 mutants exhibit developmental deformities in their egg laying apparatus, likely have fewer GSCs, whereas embryonic development appears normal. We are currently assaying animals for changes in germ cell identity. Our results will be reported.

Poster #18
Presenter: Johnathan Rodriguez
Sponsors: Andrea Bear & James Cherry (Theater)
Title: Costume Designing *The Glass Menagerie*

My senior project as a theatre major was to design the costumes for Wabash College's upcoming theatre production of *The Glass Menagerie*. To start, I researched the time period which the play took place. I looked into the fashion history of the 1930's to 40's, to understand how fashion and World War II co-existed. Additionally, I explored how the war impacted fashion during this time. Once I gained the insight on the fashion trends, I was able to move on to the rendering process. I met with the director to understand her vision for the production so that I can correctly portray the 1930's and 40's. Once we agreed on the vision, I moved forward with the rendering process and began creating designs for my last show as a student at Wabash College.

Poster #19
Presenter: Mike Gore
Sponsor: Patrick Burton (Biology)
Title: Cyclopamine Inhibition of Hedgehog Signaling Regeneration in *Pristina leidyi*

Regeneration in the phylum Annelida has been heavily tested, and there is experimental evidence from the scientific community that supports the hypothesis that these organisms re-express their embryonic regulatory cascades, such as the hedgehog (HH) cascade, when injured. In this experiment, the regenerative properties of the annelid *Pristina leidyi* were tested against a known HH inhibitor, cyclopamine. Normally when injured, *Pristina leidyi* will regenerate six head segments along with a horn on the most anterior segment. However, when cut and treated with cyclopamine, a lack of complete head regeneration (six head segments) and an absence of the horn was observed. Furthermore, the cellular mechanisms that cause this regeneration in *Pristina leidyi* are not fully understood. This experiment attempts to shed light on why this happens by comparing cell proliferation, apoptotic cell death, and muscle staining between untreated and cyclopamine-treated *Pristina leidyi*. Cyclopamine-treated Pristina exhibited an increase in cell proliferation around the wound site in addition to an increased number cells undergoing apoptotic cell death, and the treated *Pristina* exhibited a decrease in muscle staining around the wound site.

Poster #20
Presenter: Christopher Roman
Sponsor: Shamira Gelbman (Political Science)
Title: The Portrayal of Radicalized Individuals in US Media

In a period of hypermedia, rising Islamophobia and increasing terrorism around the world, news media in the United States assumes the role of informing the public with the latest information on terrorist attacks: the who, what, when, where, how? Yet, the way in which they frame information regarding radicalized individuals results in negative portrayals of Muslims and Islam. Thus, I argue that American media fuels more Islamophobia and radicalization. My study focuses on the current media portrayal of radicalized individuals in various US news outlets: CNN, USA Today, The New York Times and Fox News. I examined newspaper articles, online articles and broadcast transcripts for media coverage of six terrorist attacks in the US and Europe between 2015 and 2017: San Bernardino (2015), Paris (2015), Orlando (Pulse Nightclub) (2016), Brussels attacks (2016), Fort Lauderdale (2017), and Barcelona (2017). I am concerned with how negative portrayals of Muslims and Islam in the media can affect public opinion and political behavior that plays out in policy. My findings reveal a common storyline across the news outlets that promote a fear of Muslims/Islam and reiterates a war between Islam and the West.

Poster #21
Presenter: Patrick Kenney
Sponsor: James Brown (Physics)
Title: Evaluating Crack Behavior in Reinforced Concrete

The goal of my experiment was to analyze and characterize stress waves released by a concrete beam as it cracks under load. The stress waves emitted when I subjected a reinforced concrete (RC) beam to an increasing load were converted into electrical signals by piezoelectric sensors. Utilizing parameters of the Acoustic Emission (AE) technique, I was able to classify the variety of cracks induced by the increasing load.

Poster #22
Presenters: Connor Smith & Jacob Alaniz
Sponsor: Walter Novak (Chemisty)
Title: An Automated Method for the Correction of Unsubstantiated Ramachandran Outliers in Protein Structures

Ramachandran outliers are amino acid residues in a protein that possess an energetically unfavorable conformation, namely at the phi and psi dihedral angles. While some of these outliers are in actuality representative of the amino acid's conformation and provide insight to the protein's structure and functionality, it has been found that a large percentage of these outliers are the result of errors in the protein's structural model when they were analyzed. As a result, it is not known how many of these outliers are actually reflective of the protein's structure, or how many are the result of errors in the structural model. This was realized when it was found that the Protein Data Bank contained a large number of protein structures that possess an excessive number of outliers (>0.2%), and some containing as many as 10% outliers. In an effort to correct these excessive numbers of outliers and obtain a more accurate model of these proteins' structure, an algorithm was developed that was capable of the automated correction of the unsupported Ramachandran outliers. This program was created using Python programming language and also uses the outlier detection and refinement capabilities of the protein determination software Phenix. This algorithm was then compared to an existing browser-based software package named PDB Redo to assess how the developed program performed compared to a program made by expert crystallographers. It was found that the developed algorithm, in most instances, performed at a similar level to PDB Redo in reduction of the percent of Ramachandran outliers, increasing the percentage of favorable residues, and decreasing the R-free values with the pdb. It was then speculated that by incorporating the simulated annealing feature offered by Phenix's refinement package that the percentage of outliers would decrease even more dramatically as well as the R-Free values. This notion was then experimentally confirmed by running 10 iterations of the program and making a direct comparison of these parameters with the values given by PDB Redo.

Poster #23
Presenter: Charles Mettler
Sponsor: Bradley Carlson (Biology)
Title: Effects of Garlic Mustard on Fungal Abundance and Decomposition Capacity

Invasive plants represent a serious threat to the native structure of ecosystems worldwide. Exotic plants that become invasive can be successful through a variety of strategies. One of these strategies involves root exudation of chemicals that disrupt belowground mutualisms, leading to reduced nutrient availability for competing native plants. This mechanism has received increasing attention as more invasive plants are being shown to alter plant-mutualist interactions and biogeochemical processes mediated by microbes. In the eastern United States, the biennial herb garlic mustard has invaded significant swaths of forest. Largely due to its ability to disturb mutualistic mycorrhizal associations with allelochemicals, garlic mustard is an aggressive competitor with native plants. While its effect upon mycorrhizae are well-known, it is not fully clear whether allelochemicals produced by invasive plants are affecting the decomposition capacity of non-mycorrhizal soil fungi (saprotrophs). To address this, garlic mustard leachate was applied to soil microcosms to assess decomposition rates and hyphal abundance in a factorial experiment. Native sugar maple leachate and sterile deionized water were used as controls. Contrary to studies finding more rapid decomposition linked to garlic mustard, preliminary analyses indicate no significant effect of garlic mustard leachate upon decomposition capacity, which may illuminate the specificity of garlic mustard allelochemicals and suggests minimal effects of garlic mustard on nutrient cycling via decomposition.

Poster #24
Presenter: Immanuel Sodipe
Sponsor: Sabrina Thomas (History)
Title: Counter Insurgency to Neoliberalism

The post-Civil Rights period saw the divestment of social services and necessities, the decline of organized labor, the mass incarceration of Black people, the invasion of the carceral state into the home, and income inequality increase. But the early part of that same period also saw a global and domestic insurgency against capitalism. Labor historians and philosophers alike have traced the development of neoliberalism as the dominant political ideology in the post World War 2 period but have not paid much attention to mass incarceration's central role in that development. Mass incarceration, as counter-insurgency, not only facilitated the rise of neoliberalism, but also has remained a central aspect of it today.

Poster #25
Presenter: Nhan Nguyen
Sponsor: Walter Novak (Chemisty)
Title: C-terminal Domain of Mad1 Interacts with Mad2 to Catalyze O-C Mad2 Conversion in Coordination with Mitotic Checkpoints

Aneuploidy occurs when chromosomes are unequally separated. It is important that all chromosomes' kinetochores attach to spindle microtubules before the cell starts to divide; if not, the chromosomes will be distributed unevenly between the two daughter cells. In order to prevent chromosome mis-segregation, the mitotic checkpoint complex (MCC) prevents chromosomes that are unattached to spindles from division. Human MCC is composed of multiple proteins: Bub3, BubR1, Cdc20, and Mad2. Kinetochores that are unattached to spindles give out the signal that triggers the MCC to assemble. Once formed, the MCC is able to inhibit anaphase-promoting complex/cyclosome (APC/C). Without the activation of APC/C, the anaphase progression is temporarily stopped. In our study, we investigated Mad2, which is a critical part of the MCC. There are two functional conformations of Mad2, closed and opened, also known as C-Mad2 and O-Mad2, respectively. In the MCC, Mad2 exists in closed form (C-Mad2). Therefore, to assemble the MCC, O-Mad2 needs to be converted to C-Mad2. Our research focuses on C-terminal domain (CTD) of Mad1 indicates that Mad1-CTD binds to both O- and C-Mad2. This result suggests that CTD-Mad1 could potentially recruit O-Mad2, and convert it to C-Mad2 which then assembles into the MCC.

Poster #26
Presenter: Rodolfo Solis
Sponsor: Shamira Gelbman (Political Science)
Title: Intergroup Interaction and its Effect on Public Opinion Concerning Immigration Policy

A number of scholars have examined the effects of intergroup interaction through the multi-racial and contact theory framework. However, much of the literature has ignored the immigrant-American relation. For this reason, this research seeks to capture the true relationship between exposure (immigrant presence) and public opinion through the contact theory scope (intergroup contact reduces intergroup prejudices). That is, this paper seeks to understand if interactions between immigrants and the American public affects opinions held by Americans concerning the issue of immigration. The sample size data used for this research indicates that the contact theory is, in fact, correct when assessing the immigrant-American relation. These results give an initial understanding of the immigrant-American relation. Thus, this study will hopefully encourage prominent scholars to study the effect that this relation has on public opinion through the contact theory scope.

Poster #27
Presenter: Nicholas Morin
Sponsor: Bradley Carlson (Biology)
Title: Fish Community Structure: A Comparison of Trawl and Sonar Data

In order to monitor of the health of ecosystems, accurate and ethical sampling methods must be used. Most of the current aquatic sampling methods are heavily invasive or have sampling biases that skew their results. This study was conducted to evaluate the effectiveness of a new population sampling method called sonar, which is completely non-invasive to ecosystems and can be used no matter the turbidity. Sonar was compared to a common sampling method, the fishing trawl. Our results indicate that sonar sampled abundance and biomass more effectively than trawl surveys, and sampled large fish extremely well. Additionally, seasonal biomass changes due to migration were absent in trawl methods while extremely evident in sonar. If fish trawling was the only method we used to study the Rhode River, the massive shift in the size of fish in the colder months may never have been observed. To find out more about the differences in effectiveness of these methods and what the significance of it is, come by my poster presentation at the celebration of student research!

Poster #28
Presenters: Logan Taylor, Brandon Johnson, & Tim Leath
Sponsor: Bronwen Wickkiser (Classics)
Title: To Hell and Back: Odysseus, Elpenor, and the Underworld

Homer's *Odyssey* is one of the most well-known and enduring works of all time, and many scholars have dedicated their careers to its study. There are, however, many unanswered questions about the work, a few of which we tackled in our research this semester. In the poem, Odysseus describes his journey to the Underworld as a "*katabasis*," or a "going down," a journey which is framed by the death of one of his crewmen, Elpenor. He falls off a roof (a katabasis itself), and dies, appearing again before Odysseus in the Underworld. How do these two "*katabases*" relate? These aspects of the work have received little scholarly attention, and we each approach them in different ways. One examines the way the Underworld section bisects the narrative of Odysseus's travels, another looks at artistic representations of the scenes for clues, and another finds meaning in exploring parallels to another ancient work, Virgil's *Aeneid*.

Poster #29
Presenters: Warren Moseman & Alec Bertsch
Sponsor: Heidi Walsh (Biology)
Title: Transcription Factor C-fos Mediates Repression of GnRH Expression Induced by ER Stress

Gonadotropin-Releasing Hormone, GnRH, is an essential part of signaling in reproduction. Dysfunction of the Gnrh1 gene, normally expressed in the hypothalamus, can lead to infertility. Obesity is known to cause an excess of nutrients and fatty acids in the body. Excess nutrients can lead to inflammation and Endoplasmic Reticulum (ER) stress in the brain. In a model of GnRH neurons, Gnrh1 mRNA levels decreased when exposed to ER stress by tunicamycin (10ug/ml) as measured by qPCR. We were able to obtain similar results using a biologically similar molecule, palmitic acid, the most common fatty acid found in humans. (500uM). To further understand the pathway involved with ER stress and GnRH expression we used T5224 (20uM), a known inhibitor of the transcription factor c-fos. C-fos has been shown to increase with ER stress. We hypothesized that c-fos could be involved with the repression of GnRH by ER stress. When we treated cells with palmitic acid and tunicamycin, to represent ER stress, in combination with T5224 we observed a return to baseline mRNA levels of Gnrh1. Thus, obesity related stressors repress GnRH transcription via the transcription factor c-fos.

Poster #30
Presenters: Roarke Tollar & Nhan Nguyen
Sponsor: Charles Weiss (Chemistry)
Title: Characterization of the Catalytic Oxidation of Alcohols via Nickel and Cobalt Phosphine Complexes

The alcohol oxidation reaction is important for many different chemical applications, including synthesis and energy storage. This reaction does not proceed appreciably under ambient temperatures, so catalysts are often added to increase the rate of reaction and allow it to occur under milder conditions. Catalysts are molecules that facilitate a reaction but are not directly consumed in the process. A family of nickel phosphine complexes was examined as catalysts for the oxidation of alcohols to ketones, aldehydes, and esters, and this reaction occurs by transferring two protons and two electrons to the acetonitrile solvent. This study was conducted in order to better understand the mechanism for this particular reaction and to provide insights into how to optimize the catalytic system. Recent results show that varying concentrations of alcohol impact the rate at which the reaction proceeds. In addition, a preliminary study is underway to synthesize and examine analogous cobalt complexes as catalysts for the same reaction.

Poster #31
Presenters: Roarke Tollar, Nhan Nguyen, & Titus Edwards
Sponsor: Walter Novak (Chemisty)
Title: Design and Construction of a Structural Model of the Bifunctional GlmU Protein in Complex with N-acetyl-D-glucosamine-1-phosphate and Uridine-diphosphate-N-acetylglucosamine

The focus of this project was to explore the structure of the GlmU protein from E. coli (PDB ID: 2OI7) and to design and build a physical model that illustrates the key functional features of the protein. GlmU is a bifunctional bacterial protein that synthesizes uridine-diphosphate-N-acetylglucosamine (UDP-GlcNAc) from D-glucosamine 1-phosphate, acetyl-CoA, and UTP. The structure described here is in complex with the products desulfo-coenzyme A, N-acetyl-D-glucosamine-1-phosphate and UDP-GlcNAc. The N-terminal uridyltransferase domain is composed of two beta-hairpins and a seven-stranded beta-sheet surrounded by alpha-helices. The C-terminal acetyltransferase domain is a left-handed parallel beta-helix. GlmU functions biologically as a homotrimer. The three N-terminal uridyltransferase active sites are independently formed by each monomer; however, each of the three acetyltransferase active sites is comprised of residues from the beta-helix domain of all three monomers. This site is formed by one face of the beta-helix and a loop region of the first monomer, a different face of the second monomer beta-helix, and the C-terminal tail of the third monomer. This work was funded in part by NSF-DUE 1725940 for the CREST Project and the Wabash College Haines Biochemistry fund.

Poster #32
Presenter: David Vavrinak
Sponsor: Charles Weiss (Chemistry)
Title: Impact of Coating on Rate of in-vitro Degradation of Magnesium-based Stents

Magnesium (Mg) has properties that allow it to be a biologically compatible metal. Combined with having a high strength-weight ratio and showing terrific shock and vibration absorption, Mg has proven its potential in the medical field. It is already widely used in orthopedics, neurology, and cardiology; however, concerns with this metal include its high electrochemical reactivity and the rate of formation of its degradation product, hydrogen gas. Each of these issues are solved through chemical modifications of the metal. This study focuses on modifying the stent by coating it in various inorganic or organic coatings and studying in-vitro degradation rates of Mg in phosphate buffer solution (PBS). After studying several types of inorganic and organic coatings, as well as different metal alloys, it was concluded that time-controlled degradation of magnesium stents is possible via coating.

Poster #33
Presenters: Paul Haesemeyer & Digital Media Classmates
Sponsor: Damon Mohl (Art)
Title: Animation & Digital Compositing

This presentation consists of video examples of animation and digital compositing techniques created during the Fall 2017 semester in the following courses, Digital Filmmaking and Cinematic Environments: Digital Space. Along with excerpts and full-length original video projects, the presentation includes miniature models constructed in order to create cinematic scenes.


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