MORAVIAN COLLEGE

The 14th Annual Student Scholarship and Creative Endeavors Day

April 16, 2019

This year, 80 students, representing 27 different areas of study, are participating in the 2019 Scholars Day activities. Congratulations to these student scholars for all of their accomplishments, and many thanks to their 35 faculty sponsors. Since the inception of this event 14 years ago, 907 students have shared their scholarly accomplishments with the Moravian College community.

We invited students to submit proposals under the InFocus theme. Nine projects contain research that is consistent with one of the 4 InFocus themes: Poverty & Inequality, Sustainability, War & Peace, and Healthcare. For additional information on the InFocus Program, see https://www.moravian.edu/infocus.

The 14th Annual Moravian College Undergraduate Student Scholarship and Creative Endeavors Day
April 16, 2019

MORAVIAN COLLEGE

Schedule of Events

7:40 a.m.	**Welcome and Opening Remarks** *Haupert Union Building, Snyder Room*
7:50 a.m. – 8:45 a.m.	**Session I: HUB, UBC Room, Oral Presentations**
8:55 a.m. – 10:10 a.m.	**Session II: HUB, Snyder Room, Oral Presentations**
10:20 a.m. – 11:35 a.m.	**Session III: HUB, Snyder Room, Oral Presentations**
11:45 a.m. – 1:00 p.m.	**Session IV: HUB, Snyder Room, Oral Presentations**
11:45 a.m. – 12:45 p.m.	**Student Poster Presentations I** *Haupert Union Building, Gallery*
1:10 p.m. – 2:25 p.m.	**Session V: HUB, Snyder Room, Oral Presentations**
2:35 p.m. – 3:50 p.m.	**Session VI: HUB, Snyder Room, Oral Presentations**
4:00 p.m. – 5:00 p.m.	**Student Poster Presentations II** *PPHAC ATRIUM*

4:00 p.m. Reception (all welcome), PPHAC ATRIUM

Acknowledgements

The 14th Annual Moravian College Undergraduate Student Scholarship and Creative Endeavors Day would not have been possible without the commitment of many people at Moravian College.

In addition to all of the participating students and faculty listed in this program and all other faculty and students who collaborated on research projects this year, we would like to acknowledge the contributions of the following individuals and offices:

The Rokke Endowment for Student Research and the SOAR Program

President Grigsby and the President's Office

Moravian College Honors Program

The HUB Management Staff

Jan Ciganick, Art Department

Food Services and Facilities Management

The 14th Annual Moravian College Undergraduate Student Scholarship and Creative Endeavors Day

Program Overview

Note: Please try to attend each oral presentation session in its entirety.

7:40 AM: Opening Remarks – HUB, Snyder Room

SESSION I

Oral Presentations Session I: Moderator - Dr. Stephen Dunham HUB, Snyder Room			
7:50 AM	Sydney Costenbader *All Wrapped Up: Prehensility and the Tarsal Flexor System in the Legs of Harvestmen (Arachnida: Opiliones: Eupnoi)*	Biological Sciences	Dr. Daniel Proud
8:10 AM	William Brandes *3D-Printing for Medical Sciences Education*	Computer Science	Dr. Jeff Bush
8:30 AM	Jonathan Nadraws *Developing Biological Assays to Determine Structure Activity Relationships of Derivatives of LamD, a Signaling Peptide from Lactobacillus plantarum*	Chemistry	Dr. Michael Bertucci

SESSION II

Oral Presentations Session II: Moderator - Dr. Colleen Payton HUB, Snyder Room			
8:55 AM	Mikayla Jucewicz, Toshiana Figueroa, Estrella Sosa *Hearing Conservation: "I know better, but I don't care"- College Student*	Health Science	Dr. Monica Kaniamattam
9:15 AM	Mikayla Jucewicz, Brianna Myers *Repetitive Speech of Individuals with Traumatic Brain Injury*	Health Science	Dr. Louise Keegan
9:35 AM	Kaelyn Carr, Janessa Ortiz-Delgado, Brooke Mendibles *Maintaining a Topic With a Brain Injury*	Health Science	Dr. Louise Keegan
9:55 AM	Lyric DeSimone *A Study of Camp Quality for At-Risk Youth*	Psychology	Dr. Michelle Schmidt

SESSION III

Oral Presentations Session III: Moderator - Dr. Waller-Peterson HUB, Snyder Room			
10:20 AM	Elizabeth Horn	English	Dr. Crystal Fodrey
	"Journey to the Past": A Feminist Criticism of "Anastasia" Then and Now		
10:40 AM	Christopher Luis Shosted	English	Dr. Crystal Fodrey
	PragerU as Genre: Post-Truth Rhetoric's Attempt at Education		
11:00 AM	Jaime Ernst	English & Education	Dr. Fodrey & Dr. Shosh
	Supporting Adolescent Literacy Development Through Collaborative, Multimodal Writing		
11:20 AM	Kayleigh Ficarra	English, History, & Media Studies	Dr. Jamie Paxton
	Native American Representation in the Media		

SESSION IV

Oral Presentations Session IV: Moderator - Dr. Sarah Johnson HUB, Snyder Room			
11:45 AM	Maison Allen	English & Women's, Gender, and Sexuality Studies	Dr. Crystal Fodrey
	Rhetorical Historiography of Feminist Ideology		
12:05 PM	Erika Salus	Studio Art & Peace and Justice Studies	Angela Fraleigh
	The Intersection Between Art and Politics		
12:25 PM	Vaughn Tempesta	Physics & Queer Theory	Dr. Malenda & Dr. LaRue
	Physics: Fear of a Queer Universe		
12:45 PM	Adriana Facchiano	Neuroscience	Dr. Cecilia Fox
	The Neuroprotective Effects of Curcumin in the Striatal 6-Hydroxydopamine Rat Model of Parkinson's Disease		

SESSION V

Oral Presentations
Session V: Moderator - Dr. Alison Holliday
HUB, Snyder Room

1:10 PM	Kylie Chichura	Chemistry	Dr. Michael Bertucci
	The Effects of Multiple Amino Acid Mutations of a Key Quorum Sensing Peptide, CSP-1.		
1:30 PM	Michael Gallo	Biochemistry	Dr. Anastasia Thévenin
	Antiproliferative Effects of Gap Junction Protein Delivery to Glioma Cells Utilizing a Cancer Targeting Peptide		
1:50 PM	Mary Sampson, Brittney Legreaux, Busra Ozen, Autumn Paul	Psychology	Dr. Sarah Johnson
	The Effects of Parental Relationships on Memory		
2:10 PM	Vincent Pianoforte	Sociology & Marketing	Dr. Debra Wetcher-Hendricks
	Red Herring Effect		

SESSION VI

Oral Presentations
Session VI: Moderator - Dr. Claudia Mesa
HUB, Snyder Room

2:35 PM	Erika Zarate	Spanish	Dr. Franca Roibal Fernandez
	The Caravan of Central America		
2:55 PM	Victoria Urquiza	Spanish	Dr. Franca Roibal Fernandez
	¡Somos Más¡: The Latino Vote in the United States		
3:15 PM	Steven Berger	Mathematics, Computer Science, & Music	Dr. Schaper & Dr. Shank
	Representation and Analysis of Music Scores as Polynomials		
3:35 PM	Charles Peeke	Mathematics	Dr. Nathan Shank
	Draft to Screen: A Calculated Perspective on Animation		

POSTER SESSION I

11:45 AM - 12:45 PM
Poster Presentations I
HUB

Students		Advisor
Lauren Steinert	Music	Dr. Hilde Binford
Aboriginal Ethnomusicology: Exploring the Influence of Australian Politics, Environment and History on Aboriginal Music and Storytelling		
Noah Reiss	Psychology	Dr. Dietlinde Heilmayr
How Interpersonal Engagement Relates to Life Satisfaction and Meaning and Purpose in Life		
Marissa Cusimano	Biological Sciences	Dr. Anastasia Thévenin
Do MAP Kinases (MAPKs) Regulated Tumor Suppressive Functions of Gap Junctions?		
Katie Mayer	Environmental Science	Dr. Joshua Lord
The Impact of Temperature and Hypoxia on the Success of the Asian Shore Crab		
Irene Bonetti	Biological Sciences	Dr. Anastasia Thévenin
Mutually Exclusive Interactions of Connexin 43 Gap Junctions With Src and Zona Occludens-1 (ZO-1) Are Regulated Through Phosphorylation		
Madison Pursell	Chemistry	Dr. Alison Holliday
Analysis of Legal and Illicit Opioid Use in the Lehigh Valley		
Kyle Froehlich	Biological Sciences	Dr. Joshua Lord
Ocean Acidification and Mud Snail Chemoreception		
Rey Anaya, Peter Gingrich, Tatianna Machado, Emily Bolger	Mathematics	Dr. Nathan Shank
Cops & Robbers on Petersen Graphs		
Emma Miller, Kimberly Wolf, Matthew Meyers, Ed Harbison	Mathematics	Dr. Nathan Shank
The Magic of 3x3 Magic Squares		
Austin Grace	Environmental Science	Dr. Daniel Proud
Erginulus Systematics		
Ellen Evans	Public Health	Dr. Franca Roibal Fernandez
Social Determinants of Health: A Study of the Correlation Between Pregnancy and Exacerbation of Mental Health Issues Among Incarcerated Women		

Elizabeth Kyle-LaBell	Biological Sciences	Dr. Frances Irish
Do Naïve Neonate Asian Vine Snakes Take Longer To Catch And Swallow Prey Than Adults?		
Alayna Koch	Biological Sciences	Dr. Kara Mosovsky
Analysis of Soil Microbes from Palmerton Zinc Pile Superfund Site		
Matthew Conners	Physics	Dr. Kelly Krieble
Investigating the Mechanical Quantities of Inelastic Collisions		
Crystal Yautz, Hunter Runge	Psychology	Dr. Sarah Johnson
Perceptions of Sexual Assault		
Toshi Figueroa, Mikayla Jucewicz, Estrella Sosa	Health Science	Dr. Monica Kaniamattam
Noise Exposure and Hearing Conservation Among College Students		
Fadi Hanna	Biological Sciences	Dr. Michael Bertucci
Muting the LamD Gene in Lactobacillus plantarum		
Youssef Khayata	Biological Sciences	Dr. Christopher Jones
Testing Antiepileptic Drugs on Different Bang-Sensitive Mutations in Drosophila Melanogaster		
Michael Gallo, William Pelletiers	Public Health	Dr. James Teufel
The Intersection of Justice and Health: An International Analysis		
Ariana Caiati	Chemistry	Dr. Shari Dunham
Electrophoretic Analysis of Metal-DNA Interactions Using a Fluorescent DNA Duplex		

POSTER SESSION II

4:00 PM - 5:00 PM
Poster Presentations II
PPHAC Atrium

Students		Advisor
Adrianna Mantz	Psychology	Dr. Dietlinde Heilmayr
The Relationship Between Nature Features and Changes in Health		
Anna Esposito	Business	Dr. Lizabeth Kleintop
Incivility in Teams: The Work Performance Changes That Result from Incivility		
Youssef Khayata, Ciara Nicholson	Public Health	Dr. Colleen Payton
Historical Trends Of Syrian Refugee Arrivals To Pennsylvania (2008-2018)		
Katie Boyle	Environmental Science	Dr. Joshua Lord
The Ecology of Long-Term Color Change in Callinectes Sapidus		
Charles Peeke, Erika Zarate, Mark Morykan, Frederick Younes	Mathematics	Dr. Nathan Shank
3 Player Edge Deletion Games on Path Graphs		
Kayla Valle, Nihal Capan, Alvaro Belmonte	Mathematics	Dr. Nathan Shank
Sudoku Patterns in Octagons		
Gabriella Nasta	Education	Dr. Jean DesJardin
Parents' Communication Strategies While Reading to Their Preschool Children with Hearing Loss		
Ashlyn Cantrel	Chemistry	Dr. Michael Bertucci
Elucidation of the Native Structure and Cyclic Linkage of LamD558, a Signaling Peptide from Lactobacillus Plantarum		
William Pelletiers	Public Health	Dr. James Teufel
Expanding the Determinants of Health to Incorporate Rule of Law and Sociolegal Needs		
Chris Sorich	Ecology	Dr. Diane Husic
Assessment of Prescribed Burnings at Lehigh Gap Wildlife Refuge		
Andrew Bainbridge	Chemistry	Dr. Stephen Dunham
Synthesis of a Novel Dirhodium Compound as a Targeted Anti-tumor Agent		
Bryan Harvey	Physics	Dr. Kelly Krieble
Fragment Alignment Analysis in Post Collision Dynamics		

Gabrielle Stanley	English	Dr. Crystal Fodrey
Understanding the Learned Conceptions of Writing that First-Year Students Bring to College		
Nathaniel Rhoads	Economics	Dr. Sonia Aziz
Socio-Economic Analysis of Satellite Observations to Predict Cholera		
Kelly Gonoude	Health Science	Dr. Donna Keeler
A Comparison Between Perceived Physical Activity and Actual Physical Activity in Community Dwelling Older Adults		
Alec Buttner, Emilee Engler	Chemistry	Dr. Michael Bertucci
Synthesis of Peptide-Based Quorum Sensing Modulators for S. pneumoniae		
Jared Miller	Biochemistry	Dr. Shari Dunham & Dr. Anastasia Thévenin
What Rhodium Compounds Will Kill Cancer Cells?		
Jade Powers	Chemistry	Dr. Alison Holliday
GC-MS and HPLC Analysis of SPME Water Extracts		
Em Adam, Tevo'n Campbell	Biological Sciences	Dr. Frances Irish
Kinematics of Prey Capture, Manipulation, and Swallowing in Asian Vine Snakes		
Charles Peeke	Computer Science	Dr. Jeff Bush
Musical Interpretation Through Machine Learning		
Jessica McCormick	Chemistry	Dr. Stephen Dunham
Synthesis and Characterization of a Novel Dirhodium Complex		
William Pelletiers	Political Science	Dr. Faith Okpotor
Post-Election Violence in Africa: 1990 – 2017		

Student Oral Presentations I
HUB, Snyder Room
7:50 – 8:45 AM

Moderator: Dr. Stephen Dunham

Title:	**All Wrapped Up: Prehensility and the Tarsal Flexor System in the Legs of Harvestmen (Arachnida: Opiliones: Eupnoi)**			
Students:	Sydney Costenbader			
Advisor:	Dr. Daniel Proud			
Location:	HUB, Snyder Room	7:50 AM	-	8:05 AM

The order Opiliones, commonly known as "harvestmen" or "daddy long-legs," is a diverse group of arachnids with more than 6,500 species. Like all arachnids, harvestmen have eight legs; each leg is divided into seven segments, separated by elastic tissues, and terminates in a claw. Harvestmen of the suborder Eupnoi possess a tarsus that is capable of prehensile movements. These abilities are attributed to the tarsal flexor system (TFS), which consists of two tendons that run the length of the tarsus and attach to the internal surface of the claw. We discovered a single intrinsic muscle located dorsally in the first tarsomere, which acts to extend the leg, that had not been previously reported for this group of harvestmen. "Pulleys" aid in keeping the inferior flexor tendon in place against the cuticle because there are no muscles associated with the inferior tendon that are intrinsic to the tarsus. We sectioned numerous leg segments in cross and longitudinal sections and confirmed the presences of the tendons and pulleys in this lineage of harvestmen. Our understanding of the TFS may have important implications for the evolution of the arthropod leg, as well as in the development of advanced biomedical technology.

Title:	**3D-Printing for Medical Sciences Education**			
Students:	William Brandes			
Advisor:	Dr. Jeff Bush			
Location:	HUB, Snyder Room	8:10 AM	-	8:25 AM

Anatomical and physical therapy teaching implements can often be expensive or inaccessible to educators. The cost of a physical model of an organ may be so high so as to prohibit an instructor from purchasing an amount necessary to properly teach his or her students. Additionally, the case may be that no model or product is even available that satisfies an educator's specific needs and or teaching methods. With the advent of 3D-Printing, custom models can be developed according to an instructor's needs, and produced in any number at a very low price.

Title:	**Developing Biological Assays to Determine Structure Activity Relationships of Derivatives of LamD, a Signaling Peptide from Lactobacillus plantarum**			
Students:	Jonathan Nadraws			
Advisor:	Dr. Michael Bertucci			
Location:	HUB, Snyder Room	8:30 AM	-	8:45 AM

The goal of this project was to develop a biological assay that can quantify biofilm formation in the commensal bacterium Lactobacillus plantarum. This assay would then be used to observe how a quorum sensing (QS) system in

L. plantarum, which is controlled by a natural signaling peptide called LamD, is affected by synthetic peptide derivatives of LamD. A crystal violet absorbance assay was used to stain biofilm formed by L. plantarum and measure the absorbance of the stain at 595 nm, which is directly proportional to the formation of biofilm. Numerous assay conditions were screened, resulting in an assay using a 96 well plate, MRS broth supplemented with 1% glucose, and a dumping protocol to wash the well plate. The assay resulted in a mean absorbance of 0.47 ± 0.09 (18%) A.U., with a standard error of 0.02 ± (3.2 %) A.U.

Student Oral Presentations II
HUB, Snyder Room
8:55 – 10:10 AM

Moderator: Dr. Colleen Payton

Title:	**Hearing Conservation: "I know better, but I don't care"- College Student**			
Students:	Mikayla Jucewicz, Toshiana Figueroa, Estrella Sosa			
Advisor:	Dr. Monica Kaniamattam			
Location:	HUB, Snyder Room	8:55 AM	-	9:10 AM

Teenagers regularly expose themselves to leisure noise and are at risk of acquiring hearing damage (WHO,2018). In February 2019, an online survey was conducted among students of Lehigh Valley Association of Independent Colleges (LVAIC) to understand their knowledge, beliefs and perceptions about hearing conservation, and recreational noise-induced hearing problems. Responses were obtained from 136 participants (33 males, two undisclosed and 101 females). An interesting theme observed was that most students, despite being aware of noise-induced hearing loss and its causes, were unwilling to take actions for hearing conservation. This presentation will focus on illustrating the theme mentioned above. Almost all of the participants (97.7%, N=126) were aware that prolonged exposure to loud noise could cause permanent hearing loss. A majority (80.8%, N=110) believed that losing their hearing would be a problem. Only 45.5% (N=62) students reported that they were planning on using ear protection devices while being exposed to loud sounds. Less than one fifth (18.3%, n=25) of the students were willing to leave a concert or sporting event which was too loud. This study highlights the need for more future research and more effective hearing conservation measures for LVAIC students.

Title:	**Repetitive Speech of Individuals with Traumatic Brain Injury**			
Students:	Mikayla Jucewicz, Brianna Myers			
Advisor:	Dr. Louise Keegan			
Location:	HUB, Snyder Room	9:15 AM	-	9:30 AM

Social interaction is such an important part of daily life on a personal, interpersonal, and community level (De Nil, Theys & Jokel, 2018). The areas of the brain controlling speech and language are highly related to other cognitive functions (e.g. memory, attention, etc.). Hence, when there is a problem in the brain, communication can be one of the many things impacted (De Nil, Theys & Jokel, 2018). The researchers have analyzed transcripts of individuals who have had traumatic brain injuries and, therefore, have problems with their communication. The researchers have examined the inconsistencies and disfluencies that occur in the communication of two specific individuals who have experienced a traumatic brain injury and have focused on perseveration, and stuttering. Stuttering is defined as involuntary disruption in the normal flow of speech (Smith & Weber, 2017). Perseveration is the unintentional

repetition of a previous utterance (Sandson & Albert 1984). The data indicated that these participants demonstrated all of these difficulties with their communication, as observed in a group setting. The researchers will discuss what triggers these repetitions, why these repetitions could be occurring and what these repetitions tell us about the individuals brain injury with a focus on patterns that emerge from the data.

Title: **Maintaining a Topic With a Brain Injury**
Students: Kaelyn Carr, Janessa Ortiz-Delgado, Brooke Mendibles
Advisor: Dr. Louise Keegan
Location: HUB, Snyder Room 9:35 AM - 9:50 AM

The brain is a complex structure with many interconnected communicative components (Huth, et al., 2016). Individuals who have had traumatic brain injuries can have deficits in many of the brain's functions. The current research focuses on the difficulties created by traumatic brain injuries as a result of damage to the brain areas that control speech and language. Through discourse analysis of transcripts, the researchers have examined communication deficits such as ability to change topics, to maintain topics, and to stay focused on the conversation at hand. This is described in the literature as topic maintenance (MacDonald, 2017). Topic maintenance, for the purposes of this research, is the ability of the individual to stay on the subject, which the rest of the group is focused on. This is discussed using examples from an individual with a traumatic brain injury. The individual was observed interacting in a group setting where some participants have a traumatic brain injury and others do not. The researchers will describe the topic maintenance issues that arise, including the reasons and causes behind this communication difficulty.

Title: **A Study of Camp Quality for At-Risk Youth**
Students: Lyric DeSimone
Advisor: Dr. Michelle Schmidt
Location: HUB, Snyder Room 9:55 AM - 10:05 AM

This applied research study involved designing an assessment tool for a summer camp for at-risk children. The final tool asked children to rate their sense of belongingness at camp and their quality of friendships at camp. The sample included 135 children, ages 7-12, who provided data over the course of four weeks in Summer 2018. We found that the camp was accomplishing its goals of positive friendship experiences and belongingness at camp. Overall, a majority of kids felt like they belonged at camp and had strong friendships at camp. Results were discussed with camp staff in order to identify ways that the camp were effective and ways in which they could better meet the needs of the campers.

Student Oral Presentations III
HUB, Snyder Room
10:20 – 11:35 AM

Moderator: Dr. Dr. Waller-Peterson

Title:	**"Journey to the Past": A Feminist Criticism of "Anastasia" Then and Now**		
Students:	Elizabeth Horn		
Advisor:	Dr. Crystal Fodrey		
Location:	HUB, Snyder Room	10:20 AM -	10:35 AM

Rhetoric can be used as a helpful tool to understand the changing mindsets of society and culture depending on the kinds of media that people gravitate towards. By choosing a work of art that is popular throughout decades, it is possible to understand different generations and the values that they held. "Anastasia," which is a historical fiction tale that has been remade numerous times in the past 70 years, is analyzed here to understand why the storyline and character changed throughout the different versions of her tale. By analyzing the film produced in 1956, the children's film in 1997, and the Broadway production in 2017, it is possible to see changing attitudes towards women and their role both in their own lives and the lives of others.

Title:	**PragerU as Genre: Post-Truth Rhetoric's Attempt at Education**		
Students:	Christopher Luis Shosted		
Advisor:	Dr. Crystal Fodrey		
Location:	HUB, Snyder Room	10:40 AM -	10:55 AM

PragerU.com is a right-leaning website that publishes videos on several social topics such as race, government policy, and education while styling itself as a university without a campus. However, a rhetorical genre analysis shows that the features common to PragerU videos have little in common with typical academic discourse. The analysis shows that the shared features of PragerU's videos display a rhetorical strategy rooted in the goal of usurpation and sowing distrust. The website continually attempts to undermine American institutions of higher education by accusing college faculty and administration of squandering student tuitions and tax dollars to further a leftist agenda. The evidence PragerU's speakers present are demonstrably false but remain effective within the contemporary rhetorical ecology. What makes these statements effective has little to do with their correspondence to objective truth, but rather their strategic value in reinforcing political ideologies. But when their goals are made clear and their statements are held to scrutiny, these statements can be confronted and dispatched.

Title:	**Supporting Adolescent Literacy Development Through Collaborative, Multimodal Writing**		
Students:	Jaime Ernst		
Advisor:	Dr. Crystal Fodrey & Dr. Joseph Shosh		
Location:	HUB, Snyder Room	11:00 AM -	11:15 AM

This action research study challenges the paradigm which so often pervades the common classroom: the limited definitions of reading and writing taught in adolescent literacy development settings. The project was designed to

identify what conceptions adolescent students may have towards reading and writing as well as how a multimodal approach to education in a setting outside of school may affect these conceptions. Therefore, during a summer camp context, eleven students wrote using multimodal strategies and reflected upon on their definitions of "reading" and "writing." The project simultaneously explored the modern literacy pedagogy field in order to define multimodality as well as identified student understanding of literacy in order to determine how those descriptions would potentially change with the use of multimodal strategies. The students used digital literacies and technology and worked in small, homogenous groups during the creation of their multimodal projects. The students' understanding of writing was recorded before, during, and after the study through surveys in various contexts and modes. After the completion of the showcase, an event in which the students displayed their work to the entirety of the camp, the students completed the post-project survey. This was recorded audio-visually and compiled into a multimodal video.

Title: **Native American Representation in the Media**
Students: Kayleigh Ficarra
Advisor: Dr. Jamie Paxton
Location: HUB, Snyder Room 11:20 AM - 11:35 AM

This presentation will be a chronological look at the ways in which Native Americans have been portrayed in television and movies, from early Westerns, like "Stagecoach" to the 1990 epic film "Dances with Wolves". Starting with the silent films of the late 1800s and ending with present-day depictions, this project is meant to provide a brief overview of how these representations have changed over time and an analysis of why these changes have taken place.

Student Oral Presentations IV
HUB, Snyder Room
11:45 – 1:00 PM

Moderator: Dr. Sarah Johnson

Title: **Rhetorical Historiography of Feminist Ideology**
Students: Maison Allen
Advisor: Dr. Crystal Fodrey
Location: HUB, Snyder Room 11:45 AM - 12:00 PM

This research is a part of a semester-long independent study that examines feminist ideology as it has evolved throughout the different waves of feminism. In doing this research, I have completed a bibliographic essay that compiles scholarly sources in feminism and writing studies and creates a conversation between the ideals of feminists of different era. Through discovering a variety of ideals within feminism (especially in historical context), this research seeks to examine how feminism has fallen short of being inclusive of those with deeply layered identities of oppression. By examining these texts, as well as texts from respected rhetoric theorists with an intersectional lens, I

have been able to determine discrepancies in feminism and work towards a possible solution that will be presented in the form of an easily accessible website.

Title:	**The Intersection Between Art and Politics**		
Students:	Erika Salus		
Advisor:	Angela Fraleigh		
Location:	HUB, Snyder Room	12:05 PM -	12:20 PM

My research investigates the intersection between art and politics in order to create a series of paintings pertaining to social issues that are relative to my personal experience. I researched contemporary artists including Andrea Bowers, Derek Fordjour, and Martha Rosler to understand their conceptual process when creating politically charged artwork. From there I began creating I also looked at artists such as Mamma Andersson, Kaye Donache, Michael Raedecker, and Doron Langberg for their approach to mark-making, palette, and aesthetics.

Title:	**Physics: Fear of a Queer Universe**		
Students:	Vaughn Tempesta		
Advisor:	Dr. Ruth Malenda & Dr. Robert LaRue		
Location:	HUB, Snyder Room	12:25 PM -	12:40 PM

A physicist's journey through higher education can vary from accepting to hostile depending on the student's race, gender, socioeconomic class, sexuality, etc, due to a climate in physics that unconsciously enforces a culture of discomfort with diverse social experiences. This phenomenon is counterintuitive because of physics essential ability to examine the queer elements of the natural world. A study recently conducted on the experiences of gender and sexual minorities in physics found that a significant fraction of LGBT physicists have experienced or observed exclusionary behavior in their workplace and school environments. LGBT physicists with additional marginalized identities face greater levels of discrimination, and transgender and gender-nonconforming physicists encountered the most hostile environments. As a consequence of this, 39% of physicists in historically marginalized communities consider leaving the field each year. This project draws from physicist Karen Barad's theory of agential realism to investigate this critical situation, and grounds itself on the belief that the world is one whole, rather than two separate realms of the social and the natural in order to analyze the undergraduate/graduate/post-graduate pipeline in America. I draw from Barad's idea of matter as doing to exploit the ethical relationship between actors in physics. Barad's notion of spacetimemattering is based on her idea of agency, causality, and entanglement, which ensues an ethics of responsibility and can be applied to questions of power. Within the field, I investigate various case studies using a "Baradian" diffractional analysis to look at the (re)shaping of boundaries and phenomenon. I also interpret these stories using other's research on the intersections of the sciences and social theories (such as feminist theory, critical race theory, queer theory, postcolonialism, etc.), and more specific studies on the current social and cultural climate in physics. The ultimate goal is to extract a series of recommendations for the field to make it more equitable.

Title:	**The Neuroprotective Effects of Curcumin in the Striatal 6-Hydroxydopamine Rat Model of Parkinson's Disease**		
Students:	Adriana Facchiano		
Advisor:	Dr. Cecilia Fox		
Location:	HUB, Snyder Room	12:45 PM -	1:00 PM

Parkinson's disease (PD) is a progressive neurodegenerative disorder that develops when dopamine neurons within the nigrostriatal pathway are destroyed from inflammation, which may be the result of enhanced microglial cell activation. Curcumin, a compound derived from turmeric, has shown to not only provide protection to dopamine neurons, but also reduce this inflammatory response in the 6-hydroxydopamine (6-OHDA) nigral lesion rat model. Furthermore, previous research from our lab demonstrated that curcumin has both protective and restorative effects in this acute model of PD. The current study investigated whether curcumin could exert a similar restorative effect in the more progressive 6-OHDA intrastriatal lesion model of PD. Each experimental animal received an injection (i.p.) of 75 mg/kg curcumin for 3 days/week while the control animals received an equal volume of the vehicle, DMSO, for 6 weeks post-surgery. Behavior data using the rotarod and foot-fault tests were obtained for six weeks post-surgery. Analysis of behavior data did not reveal a significant main effect between time and group in either test. Analysis of percent survival of dopamine neurons within the substantia nigra was assessed via stereology and revealed a significant difference between the control and experimental groups, suggesting curcumin may have a restorative effect in this striatal lesion model.

Student Oral Presentations V
HUB, Snyder Room
1:10 – 2:25 PM

Moderator: Dr. Alison Holliday.

Title:	**The Effects of Multiple Amino Acid Mutations of a Key Quorum Sensing Peptide, CSP-1.**			
Students:	Kylie Chichura			
Advisor:	Dr. Michael Bertucci			
Location:	HUB, Snyder Room	1:10 PM	-	1:25 PM

Quorum sensing is a cell-density dependent form of bacterial communication used by S. pneumoniae. Quorum sensing is controlled by extracellular chemical molecules synthesized by bacteria; the quorum sensing molecule in S. pneumoniae is CSP1. Multiple mutations of the amino acid sequence were synthesized to modify the peptide and create an inhibitor. These peptide derivatives were made in order to elucidate the structure-function relationship between CSP-1 and its induction of quorum sensing.

Title:	**Antiproliferative Effects of Gap Junction Protein Delivery to Glioma Cells Utilizing a Cancer Targeting Peptide**			
Students:	Michael Gallo			
Advisor:	Dr. Anastasia Thévenin			
Location:	HUB, Snyder Room	1:30 PM	-	1:45 PM

Connexin43 (Cx43) is a transmembrane protein that assembles to form gap junction channels which are critical to intercellular communication processes. The carboxy terminus of Cx43 (Cx43CT) is known to interact with c-Src, a non-receptor tyrosine kinase, that plays a role in the regulation of cell proliferation. Src has a high degree of activity in gliomas, and glioma cells have a characteristic reduction in expression of Cx43. Previous research demonstrated that reintroduction of Cx43 carries antiproliferative effects. In our design of Cx43-based cancer therapeutics, we aim to identify the phosphorylation state of Cx43CT that best recruits and inhibits Src. Two phosphorylation sites in

particular (S279 & S282), lie directly in the Src-binding region. Phosphomimetic constructs were created to mimic dual-phosphorylated, and dual-unphosphorylated states of Cx43CT to explore their impact on Src binding. pHLIP (pH-Low Insertion Peptide) is a peptide with a high degree of specificity for the tumor microenvironment, that inserts into the cell membrane at a lower pH. By linking the Cx43CT to pHLIP, we have selectively reintroduced Cx43 to the cytoplasm of cancerous cells. Preliminary results demonstrate that pHLIP-Cx43 peptide causes cytotoxicity in rat glioma cells in a phosphorylation-dependent manner.

Title:	**The Effects of Parental Relationships on Memory**			
Students:	Mary Sampson, Brittney Legreaux, Busra Ozen, Autumn Paul			
Advisor:	Dr. Sarah Johnson			
Location:	HUB, Snyder Room	1:50 PM	-	2:05 PM

This study will attempt to achieve a better understanding of how the gender of the participant and the participants' gender schemas affect gender identification of a neutral character as well as what each participant remembers about that character. A story will be presented about a neutral character, Sam, who completes tasks associated with stereotypical masculine, feminine, and neutral behaviors. After a filler task, we will ask participants recall behaviors that Sam engaged in. Subsequently, we will ask participants to identify Sam's gender. They will then be instructed that Sam was of the opposite gender than they had predicted and will be asked to recall again to see if anything had changed. We hypothesize that men will recall more masculine tasks and identify Sam as a male as compared to females, who will recall more feminine tasks and identify Sam as female. After switching gender perspectives, we hypothesize that men will recall fewer feminine behaviors than the women, and vice versa for masculine behaviors, due to gender stereotypes and schemas in our memory.

Title:	**Red Herring Effect**			
Students:	Vincent Pianoforte			
Advisor:	Dr. Debra Wetcher-Hendricks			
Location:	HUB, Snyder Room	2:10 PM	-	2:25 PM

For my presentation, I will reflect on a marketing advertisement strategy called the red herring effect. This effect is used in all types of media advertisements. A red herring effect is a marketing tool involving the distraction of the audience with an irrelevant topic. This tactic draws away the attention of viewers from the original product, providing them with or suggesting a positive feeling or experience. The goal is to lead the audience into associating this positive feeling or experience the product being advertised. In my presentation, I will give an overview of how this marketing strategy is used and what it is used to advertise. I will also describe my study evaluating commercials from this year's Super Bowl. I will discuss the types of industrial products that are more prone to being advertised with a red herring technique in this context, including whether the products are geared toward males or females. My results focus upon data that indicate whether the red herring approach was skewed a certain way with respect to types of products and the target audience. I will show examples of commercials that present the red herring technique to discuss.

Student Oral Presentations VI
HUB, Snyder Room
2:35 – 3:50 PM

Moderator: Dr. Claudia Mesa

Title:	**The Caravan of Central America**			
Students:	Erika Zarate			
Advisor:	Dr. Franca Roibal Fernandez			
Location:	HUB, Snyder Room	2:35 PM	-	2:50 PM

The Caravan of Central America brought a lot of controversy to the United States. After a US backed coup, life became unbearable for many in Honduras, and a plan was made to flee and seek asylum in the US. This presentation, translated and adapted from a paper I presented at the Mid-Atlantic Council on Latin American Studies Conference, in Stony Brook University, will analyze the recent Caravan and the United States' involvement regarding this event.

Title:	**¡Somos Más¡: The Latino Vote in the United States**			
Students:	Victoria Urquiza			
Advisor:	Dr. Franca Roibal Fernandez			
Location:	HUB, Snyder Room	2:55 PM	-	3:10 PM

Latino voters in the United States have usually kept away from the polling stations. Unfortunately, the current administration under Trump, through voter disenfranchising and consistently adhering to an anti-minority rhetoric, has demonstrated to Latinos that voting is a right they should exercise in order to have their interests represented. With the encouragement of candidate campaigning, political organizations, and empowering officials such as Alexandria Ocasio-Cortez, the number of Latino registrators and voters has increased. This presentation, translated and adapted from a paper I presented at the Mid-Atlantic Council on Latin American Studies Conference (MACLAS), in New York, will analyze historical trends in Latino voting in the U.S. and ways to progress in mobilizing the Latino voter.

Title:	**Representation and Analysis of Music Scores as Polynomials**			
Students:	Steven Berger			
Advisor:	Dr. Greg Schaper & Dr. Nathan Shank			
Location:	HUB, Snyder Room	3:15 PM	-	3:30 PM

The purpose of this research is to use an interdisciplinary approach to compare measures of similarity between various musical phrases (including both melodies and bass lines). The Python programming language will be used to collect, store, and analyze MIDI files containing the musical data. Both continuous and discrete similarity measures were tested in order to see if the mathematical representations have any musicological significance. This research has

applications to file storage, melodic classification, determining the complexity of a music excerpt, discovering copyright infringement, and identifying the composer given a music excerpt.

Title: **Draft to Screen: A Calculated Perspective on Animation**
Students: Charles Peeke
Advisor: Dr. Nathan Shank
Location: HUB, Snyder Room 3:35 PM - 3:50 PM

The world of visual arts and animation has changed, been changing, and developing at rapid rates. This talk encompasses the techniques used from its origin, the "Nine Old Men" of Disney, all the way to the animation practices of Pixar and modern day animation studios. As the times have changed, so has the process of draft to the big screen. Yes, quantitatively, the cost, time, resources, and labor have become more optimal for animation studios. And yet, are we as consumers aware of the ways in which the small nuances that define this quality content have faded over time?

Student Poster Presentations I
HUB Gallery
11:45 - 12:45 PM

Title: **Aboriginal Ethnomusicology: Exploring the Influence of Australian Politics, Environment and History on Aboriginal Music and Storytelling**
Students: Lauren Steinert
Advisor: Dr. Hilde Binford

The purpose of my SOAR project was to use my research and findings to show the impacts of Australian heritage and culture on the Australian aboriginal peoples that are not widely known here in the United States. This project allowed me to shed light on the progression of a culture, and explore what the influence of Australian politics, biology, environment and history have had on Aboriginals, their music and storytelling. My work was also to inform the proposed 2019 May term on the same topic, led by Dr. Binford. Looking ahead to 2019-20, I hope to include an aboriginal work on my junior/senior recital.

Title: **How Interpersonal Engagement Relates to Life Satisfaction and Meaning and Purpose in Life**
Students: Noah Reiss
Advisor: Dr. Dietlinde Heilmayr

The present study seeks to address whether the quality of interaction with others relates to changes in health and well-being over a two-week period. It was found that interpersonal engagement was negatively correlated to change in satisfaction with life ($r = -0.233$) and meaning and purpose with life to a very small degree ($r = 0.012$) but not at a statistically significant level. There remains much that can further explore in this relationship.

Title: **Do MAP Kinases (MAPKs) Regulated Tumor Suppressive Functions of Gap Junctions?**

Students: Marissa Cusimano
Advisor: Dr. Anastasia Thévenin

Connexin 43 (Cx43) is a transmembrane protein, gap junction (GJ) protein that is known to interact with the well-known oncogene, Src. Since, Cx43 is phosphorylated by many different kinases, including ERK, we aim to understand if Cx43/Src interaction is driven by ERK. The goal of my specific experiments is two-fold: to test if phosphorylation on sites S255, S279 and S282 by purified active ERK, plays a role in recruiting Src. The second goal is to generate mutants of Cx43 with both sites (S279 and S282) mutated to either alanines or glutamates, to prevent or mimic phosphorylations at these sites, respectively. Preliminary results from the in vitro phosphorylation experiments using purified active ERK and Cx43 C-terminus indicate that active ERK is able to effectively phosphorylate Cx43. This research will move our laboratory forward in our design of Cx43-based Src inhibitors.

Title: **The Impact of Temperature and Hypoxia on the Success of the Asian Shore Crab**
Students: Katie Mayer
Advisor: Dr. Joshua Lord

The invasion of the Asian shore crab in coastal communities along the eastern seaboard of North America has negatively impacted native species diversity and population sizes. Managing this invasive species requires the use of experiments to better understand the mechanisms that favor its establishment. The results of this study predict how changing environmental conditions like temperature and oxygen levels influence the feeding and respiration rates of Asian shore crabs. This species of crab is not typically found in waters south of North Carolina, and it is possible that environmental conditions such as temperature and hypoxia limit its spread and impact. By studying how frequently Asian shore crabs feed under different environmental conditions, this experiment determined that both temperature and hypoxia can substantially impact the feeding and respiration rates of these crabs. The higher temperatures and lower oxygen levels associated with climate change may cause this species to have a more difficult time maintaining or establishing a population. These results provide a tool that coastal environmental managers can use to help predict where this species may migrate to and become established with changing ocean conditions.

Title: **Mutually Exclusive Interactions of Connexin 43 Gap Junctions With Src and Zona Occludens-1 (ZO-1) Are Regulated Through Phosphorylation**
Students: Irene Bonetti
Advisor: Dr. Anastasia Thévenin

Connexin 43 (Cx43) is a transmembrane protein that constitutes intercellular communication structures, called gap junctions (GJ). These Gap Junctions are responsible for the passage of small molecules and ions, facilitating many critical physiological functions, including cellular growth and development. Connexin 43 C-terminus is phosphorylated at many residues (serines and tyrosines), and phosphorylation is known to regulate GJ function, such as trafficking of Cx43 toward the plasma membrane, GJ assembly, opening and closing, as well as GJ internalization. Cx43 C-terminus interacts with many proteins, including a scaffolding protein, Zona Occludens-1 (ZO-1) and a potent oncogene, Src. Interestingly, Src and ZO-1 binding and interaction with Cx43 GJs are mutually exclusive. Binding of ZO-1 to the last 4 amino acids on Cx43 C-terminus regulates the rate of GJ accrual at the plasma membrane. In addition, GJs remain open and functional when ZO-1 is bound, while ZO-1 detachment coincides with GJ closing. Moreover, it was determined that phosphorylation of S373 (by activated Akt) or through mimicking phosphorylation at that site leads to detachment of ZO-1 from Cx43 C-terminus. Src, on the other hand, phosphorylates Cx43 on two tyrosines (Y247 and Y265), leading to GJ closure and a drop in cell-cell communication. In addition, was recently demonstrated by others that Cx43 GJs, when expressed in glioma cells,

recruit Src to a distant region of Cx43 C-terminus (amino acids 266 to 283), causing downregulation of Src oncogenic activity. Our ongoing in vitro and in cells binding studies between Src and phosphomimetic (S373E) and phospho-dead (S373A) mutants of Cx43 show that unlike ZO-1, Src prefers interacting with Cx43 phosphorylated at S373. These results finally provide a molecular explanation as to why Src and ZO-1 have never been observed to interact with Cx43 simultaneously, giving us a better understanding of events leading up to GJ closure and internalization.

Title: **Analysis of Legal and Illicit Opioid Use in the Lehigh Valley**
Students: Madison Pursell
Advisor: Dr. Alison Holliday

The Lehigh Valley is currently in the grips of an opioid epidemic. Between 2014 and 2016, hospital stays due to an opioid overdose have increased by 66%. The deaths related to opioid overdoses in 2016 were double that of both 2014 and 2015. Since these drugs are highly prevalent in the Lehigh Valley and they - or their metabolites - will eventually reach wastewater, testing of wastewater can be used to determine the amount of these drugs present. Heroin has been a big player in the opioid crisis, so their metabolites are important to test in wastewater. The drugs being analyzed; morphine, codeine, and 6-acetylmorphine (6-am) were all able to be detected, however, 6-am is near the detection limit.

Title: **Ocean Acidification and Mud Snail Chemoreception**
Students: Kyle Froehlich
Advisor: Dr. Joshua Lord

This study observed the nonlethal predator-prey interaction between Panopeus herbstii (mud crab) and Tritia obsoleta (mud snail) under ocean acidification conditions expected by the year 2100. These types of nonlethal interactions can not only influence predator-prey relationships but also magnify the ecological impact of predators in marine habitats. Thus, it is of vital importance to understand how prey perceive the threat of predation and how this may be impacted by ocean acidification. In baseline experiments at pH 8.1, mud snails responded differently to crab cues compared to crushed conspecifics, burying in the presence of crushed conspecifics and fleeing in the presence of a mud crab. While many predator cue experiments combine these two types of cues, these results suggest that mud snails not only discern between threat cues but also have a nuanced response that is tailored to specific threats. These experimental results demonstrate that dud snail chemoreception appears to be significantly interfered with or delayed under lower pH conditions by altering its escape behavior. Ocean acidification has the potential to change mud snail behavior leading to a shift in predator-prey relationships and a reduction in nutrient cycling along the shoreline; thus, reducing ecosystem proactivity and habitat complexity.

Title: **Cops & Robbers on Petersen Graphs**
Students: Rey Anaya, Peter Gingrich, Tatianna Machado, Emily Bolger
Advisor: Dr. Nathan Shank

In this project, we explore the game of Cops & Robbers on Petersen graphs by trying to find the minimal number of cops needed to guarantee the robber's capture. We seek to find a pattern in the minimum number of cops needed across many variations of generalized Petersen Graphs.

Title: **The Magic of 3x3 Magic Squares**
Students: Emma Miller, Kimberly Wolf, Matthew Meyers, Ed Harbison
Advisor: Dr. Nathan Shank

We explore potential solutions for a 3x3 magic square of squares. By using several algorithms and patterns, our findings can be used towards solving similar problems.

Title: **Erginulus Systematics**
Students: Austin Grace
Advisor: Dr. Daniel Proud

Harvestmen belong to the arachnid order Opiliones. The family Cosmetidae is one of the most diverse but poorly studied, families of harvestmen. This family is composed of 126 genera and 719 species (Kury, 2003). Within Cosmetidae, the genus Erginulus contains 31 species that are that found in forested habitats in areas such as the southeastern United States with the majority of its distribution found in forested habitats through southern Mexico and Central America (Kury, 2003; Goodnight and Goodnight, 1947). In the early 1900s, Carl Roewer began classifying harvestmen based on a combination of a limited number of morphological characters including tarsal count, dorsal armature, and presence/absence of armature on legs III and IV. In the 1950s, Clarence Goodnight and Marie Goodnight proposed a different classification system in which they reduced the diversity down to only three genera based solely on the number of tarsomeres on leg I (Machado et al., 2007). We set out to use an integrative taxonomic approach based on morphological and molecular data (e.g., Pante et al., 2014) to evaluate the monophyly of the genus and begin to revise the systematics to reflect the true evolutionary relationships of this family. We hypothesized that Erginulus is a monophyletic genus, and that within the genus there are two separate lineages based on recent studies of penis morphology (Proud and Townsend, 2019). In addition, we will describe and diagnose a new species of Erginulus that may help to better understand the relationship between the two hypothesized lineages. Results show that Erginulus is a monophyletic group and is strongly supported through both Maximum Likelihood and Bayesian Inference analyses.

Title: **Social Determinants of Health: A Study of the Correlation Between Pregnancy and Exacerbation of Mental Health Issues Among Incarcerated Women**
Students: Ellen Evans
Advisor: Dr. Franca Roibal Fernandez

The population that is growing the fastest among the incarcerated? Women. According to the Sentencing Project, there has been an increase of nearly 700% between the years 1980 and 2016 (The Sentencing Project, 2018). Drug use, homelessness and poverty. These are three things many incarcerated women face before and after leaving the prison system. in this presentation, I will be examining the correlation between pregnancy and exacerbation of mental health issues among incarcerated women. Pregnant inmates is not a new topic, and they can be found across the globe: Mental health issues don't have a language barrier. Worldwide, people struggle with ghosts that others may not be able to see. Having a prison sentence or time in jail is enough to deeply invoke depression, anxiety and an ongoing list of mental health issues. One can only imagine that doing this while pregnant may be the hardest thing some women have to deal with. From giving birth in shackles to giving away their babies hours after they are born, many of these women's already existent health issues could be intensified, causing emotional and physical harm to the woman.

Title: **Synthesis and Characterization of a Novel Dirhodium Complex**
Students: Jessica McCormick
Advisor: Dr. Stephen Dunham

Metal ions are fundamental parts of cells chosen to work in imperative biochemical processes. Due to a metals reactivity, they are closely regulated under normal conditions and eccentric metal ions are associated with pathological disorders and diseases. Metal-based compounds have been used for chemotherapy. Rhodium is one of these potential metal-chemotherapeutics. This research is aimed at improving and developing new rhodium-based compounds. Dirhodium(II) tetraacetate dimer, Rh2(OAc)4, was used to synthesize a new rhodium complex that replaced one acetate with citric acid to form Rh2(OAc)3cit. The new compound was purified from the reaction mixture using high performance liquid chromatography (HPLC) and its structure was characterized using nuclear magnetic resonance (NMR) spectroscopy. The new compound will be used for DNA binding and cellular toxicity studies to determine its chemotherapeutic potential compared to Rh2(OAc)4.

Title: **Do Naïve Neonate Asian Vine Snakes Take Longer To Catch And Swallow Prey Than Adults?**
Students: Elizabeth Kyle-LaBell
Advisor: Dr. Frances Irish

This study compared predator-prey interactions of neonate and adult Ahaetulla nasuta preying on lizards. We hypothesized that naive A. nasuta neonates will take a longer time to capture and swallow prey than adults due to lack of experience. High speed digital videos were recorded at 500 frames/second of seven neonates and two adults during prey capture. High definition digital videos at 60 frames/second were used to record stalking and swallowing behaviors. Preliminary t-test results show no significant difference between neonates and adults in strike timing, but neonates took significantly longer to subdue and swallow prey than adults. These results appear to support our original hypothesis, but we note that neonates ate much larger prey relative to body size (30% of body weight) than adults (5-7% of body weight). Other studies have demonstrated a correlation between prey size and handling time, which we believe played a role in our study. Also, neonate snakes appeared to struggle or give up when faced with challenges such as hitting a branch during the strike or dropping the lizard. This may be due to inexperience, but we do not have sufficient data to say this with confidence.

Title: **Analysis of Soil Microbes from Palmerton Zinc Pile Superfund Site**
Students: Alayna Koch
Advisor: Dr. Kara Mosovsky

The Palmerton Zinc Pile Superfund Site is an area of approximately 3,000 acres of heavy-metal contaminated mountainside, denuded of plant life due to nearly one-hundred years of emissions from zinc smelting plants. Different treatment plots have been established on the Superfund site in an attempt to restore native grasses to the barren land, but the effect of the treatments on the soil microbes has not been analyzed. A controlled greenhouse project was conducted to determine before and after effects of the treatments on the bacterial populations in the soil from the Superfund site. Soil samples were collected at various post-treatment time points (2, 6, and 12 weeks). Following soil sample collection, bacterial DNA was isolated, purified, and sequenced. After sequencing, a bioinformatics pipeline was used to map evolutionary relatedness, classify taxonomy, and measure diversity and relative abundance of the bacteria found in the samples. Other quantitative methods for the analysis of the soil microbes included flow cytometry and traditional plating methods. Overall, our results indicated that time, rather than treatment, was the main factor affecting the bacterial populations. We will continue to research how the soil microbes contribute to the ecosystem at the Superfund site.

Title: **Investigating the Mechanical Quantities of Inelastic Collisions**
Students: Matthew Conners
Advisor: Dr. Kelly Krieble

The goal of this project was to model an inelastic collision of a rubber sphere rotating at an initial angular velocity with a surface using a high speed camera. Using Tracker, a video analysis software, we collected data about velocities, rates of rotation, and incident and reflection angles. The model developed used the dynamics of the system that included relevant physical parameters. Different fits of the data indicated that the model was in agreement with the experiment.

Title: **Perceptions of Sexual Assault**
Students: Crystal Yautz, Hunter Runge
Advisor: Dr. Sarah Johnson

We explored the interactions between victim and perpetrator gender, and the impact of a legal or social frame, in relation to perceptions of sexual assault in written scenarios. Victim gender had an impact on both legal and social perceptions: participants were more likely to view sexual assault as a crime and had less positive social attitudes about the perpetrator when the victim was female rather than male.

Title: **Noise Exposure and Hearing Conservation Among College Students**
Students: Toshi Figueroa, Mikayla Jucewicz, Estrella Sosa
Advisor: Dr. Monica Kaniamattam

An online survey carried out to assess the knowledge, concepts, and perceptions of the Lehigh Valley Association of Independent Colleges (LVAIC) students towards Noise-Induced Hearing Loss (NIHL) and Hearing Conservation. One hundred and thirty-six students (33 males, two undisclosed and 101 females) completed the survey. The participants, although being aware (81% of respondents) of the harmful effect of noise exposure, reported being exposed continuously to unhealthy doses of noise exposure. A substantial number (43.3%) of students reported weekly exposure to loud sounds, which require them to shout or speak in a raised voice to be heard at arm's length. Recreational preferences involving high noise doses was also evident. The majority (50.8%) preferred a car audio level between 50% - 75% of the total volume, while 18% of the student's preferred volume levels higher than 75%. Although a majority (71%) reported having used ear protection devices at least once in their life, few (15.4%) were prepared to give up activities involving potentially dangerous sounds. The study highlights that unhealthy doses of recreational noise exposure is prevalent, aligning with the WHO (2017) report that Hearing loss associated with recreational noise is a worsening public health problem, particularly in young adults.

Title: **Muting the LamD Gene in Lactobacillus plantarum**
Students: Fadi Hanna
Advisor: Dr. Michael Bertucci

Quorum Sensing (QS) is a cell-density dependent form of bacterial communication. It is controlled by the peptide lamD, which is produced by the gene LamD. Lacking this peptide results in the loss of the ability to QS, which is hypothesized to be involved in affecting biofilm formation. Mutant cells of Lactobacillus plantarum that lack the

LamD gene will be generated. Results showed that it is possible to transform plasmid DNA into competent Lactobacillus plantarum cells. Therefore, a plasmid will be modified and transformed into the competent cells and mute the LamD gene by homologous recombination.

Title: **Testing Antiepileptic Drugs on Different Bang-Sensitive Mutations in Drosophila Melanogaster**
Students: Youssef Khayata
Advisor: Dr. Christopher Jones

Antiepileptic drugs are the main treatment for people living with epilepsy. Even though antiepileptic drugs are available, they are effective in only two-thirds of the patients; the remaining one-third of patients report no improvement. A lot of neurological research has been done to identify and characterize epilepsy and how to make antiepileptic drugs more effective by using model organisms such as rodents and Drosophila melanogaster. Drosophila can contain different bang-sensitive mutations (eas, jus, bss, and CB) which cause the flies to seize, making them a good model to test different antiepileptic drugs, such as (cannabidiol) CBD, oxcarbazepine, phenytoin, and nicotine. Testing these antiepileptic drugs on Drosophila at different concentrations would allow us to observe how effective each medication is and what concentration is most effective. This study tests different concentrations of several drugs, such as CBD, oxcarbazepine, phenytoin, and nicotine on Drosophila melanogaster. Preliminary results of short term (3 days) exposure to oxcarbazepine had the highest effect on seizures alleviation, long term exposure (1week) are currently in progress.

Title: **The Intersection of Justice and Health: An International Analysis**
Students: Michael Gallo, William Pelletiers
Advisor: Dr. James Teufel

The intersection between justice and health has emerged as an under-explored research topic that warrants further investigation due to its wide-reaching implications. Previous research supports that rule of law should be considered as a foundational determinant of health and that variable measures of justice are tightly correlated with health outcomes. Numerous studies have found that damage to one's physical or mental health is the most commonly reported negative consequence of experiencing a civil justice issue. Civil justice issues are resolved through accessing a nation's civil justice system, and inequities in access to justice drive health disparities through the interplay of the social determinants of health. Multiple linear regression models demonstrate that variables from the 2015 iteration of the Rule of Law Index, which contains data from 102 countries representative of a majority of the global population, were significant predictors of various health outcomes. Justice variables with significant predictive ability included Rule of Law Overall, Civil Justice Overall, and Access & Affordability of Civil Justice predicting hallmark population health metrics, such as infant mortality, maternal mortality, and life expectancy. This predictive ability held for a majority of variables, even after controlling for other factors that could explain the potential variance.

Title: **Electrophoretic Analysis of Metal-DNA Interactions Using a Fluorescent DNA Duplex**
Students: Ariana Caiati
Advisor: Dr. Shari Dunham

A novel rhodium compound with potential antitumor properties was evaluated for its ability to interact with a fluorescently labeled DNA duplex. It is hypothesized that the rhodium compound will form interstrand cross links with the duplex of DNA and prevent it from denaturing into single strands. So far in this study, cisplatin, a platinum

metal compound known to form a percentage of intrastrand crosslinks on duplex DNA, has been used as a positive control. Denaturing polyacrylamide gel electrophoresis (dPAGE) has been used to analyze a duplex sample that is 39-base pairs in length which has been reacted with various transition metal compounds. It is expected that the fluorescent label on the DNA duplex will allow for more sensitive imaging of the DNA cross links than post-electrophoresis staining with Sybr Gold. Results of these gel electrophoresis studies will be presented and quantitation of the interstrand cross-linking of DNA by various metal compounds will be discussed in terms of potential antitumor activity.

Student Poster Presentations II
PPHAC Atrium
4:00 - 5:00 PM

Title: **The Relationship Between Nature Features and Changes in Health**
Students: Adrianna Mantz
Advisor: Dr. Dietlinde Heilmayr

The present study evaluates changes in health in participants who were instructed to spend time in nature. More specifically, we evaluate whether different natural elements relate to changes in health. We hypothesized that natural features such as water, vegetation, and open fields would relate more strongly to a participant's change in health as compared to man-made objects and other people. We found no statistically significant correlation between nature features and changes in health.

Title: **Incivility in Teams: The Work Performance Changes That Result from Incivility**
Students: Anna Esposito
Advisor: Dr. Lizabeth Kleintop

The occurrence of incivility in an organization results in performance changes in teams. Previous work showed how incivility hindered effective collaboration from taking place in workplace teams. Ineffective collaborating is just the beginning of the performance changes that arise as a result of incivility. The spiraling effect of witnessing incivility can further erode performance in teams. This poster displays the results of reviewing research on incivility in teams in a workplace context and how incivility changes work performance. Following from this review, a set of propositions are proposed to further research on incivility and how the occurrence of incivility impacts a teams' work performance. Those propositions are discussed in the poster session.

Title: **Historical Trends Of Syrian Refugee Arrivals To Pennsylvania (2008-2018)**
Students: Youssef Khayata, Ciara Nicholson
Advisor: Dr. Colleen Payton

The Syrian war forced 13 million Syrians to flee their homeland, including approximately 6 million internally displaced within Syria, 5 million in neighboring countries, 1 million in Europe, and almost 100,000 in North America. The United States resettled 21,163 Syrian refugees between 2008-2018, including 1,275 in Pennsylvania. Objective: To examine the historical trends in Syrian refugee arrivals to Pennsylvania by region and year.

Methods: A secondary data analysis was conducted using publicly available data from the Pennsylvania Office of Refugee Resettlement (2008-2018). Descriptive statistics were conducted to describe the number of refugee arrivals by county and refugee resettlement year (October to September). Historical trends of the Syrian refugee crisis were compiled and mapped along a timeline of refugee arrivals to Pennsylvania. Results: Between 2008-2018, 1,275 refugees resettled in Pennsylvania in the following counties: Erie (33%), Philadelphia (26%), Pittsburgh (18%), Lancaster (13%), and Lehigh (11%). Refugee arrivals increased between 2014-2015 (n = 112), 2015-2016 (n = 741), and 2016-2017 (n = 421). Conclusion: The number of Syrian refugees resettled to Pennsylvania corresponds with the increasing and decreasing control of land by anti-government groups fighting the Syrian regime.

Title: **The Ecology of Long-Term Color Change in Callinectes Sapidus**
Students: Katie Boyle
Advisor: Dr. Joshua Lord

This study observed the functional capability of Callinectes sapidus (Atlantic blue crab) to change carapace color based on different colored substrates of black and white over a 3 week period or until post-molt. After, color change the behavior of C.sapidus will be analyzed to determine whether or not they choose the correct colored substrate based on their habitat. The ability to adapt to a different environment is crucial for C.sapidus because their estuarine habitats are constantly being disturbed and developed on, therefore minor habitat relocation is to be foreseen. In baseline experiments, blue crabs placed on a black substrate were able to change color at a faster rate, whereas the crabs placed on a white substrate required a molt in order to have a large change in carapace color. Pigment distribution measured through ImageJ was found to be more uniform in the darker crabs and more variable in the lighter crabs. Blue crabs encompass some of the largest fisheries in the Atlantic estuaries, with the amount of disturbance in these areas it is crucial to determine how this important crustacean will adapt and relocate itself to survive, otherwise its predator and camouflage abilities will be diminished.

Title: **3 Player Edge Deletion Games on Path Graphs**
Students: Charles Peeke, Erika Zarate, Mark Morykan, Frederick Younes
Advisor: Dr. Nathan Shank

We explored edge deletion games on path graphs. The two player variant game has been solve, therefore, we consider games involving three players. After solving base cases, we considered harder cases. While working on larger path graphs, different patterns emerged. Therefore, we were able to create a conjecture for all path graphs which we hope to prove in the near future.

Title: **Sudoku Patterns in Octagons**
Students: Kayla Valle, Nihal Capan, Alvaro Belmonte
Advisor: Dr. Nathan Shank

We take ideas from the classic game of Sudoku to play games with new rules on larger polygons. We develop rules and trials that work in octagons. We seek patterns that will give us consistent solutions. We also find new tilings that need different rules to create a puzzle that works.

Title: **Parents' Communication Strategies While Reading to Their Preschool Children With Hearing Loss**

Students: Gabriella Nasta
Advisor: Dr. Jean DesJardin

In young children with and without hearing loss parental communication and involvement are essential for language development. The current study sought to better understand linguistic techniques and behaviors that contribute to language development in children. This research investigated the effects of teacher strategies during SBR and examined if there were any differences between groups of parents of young children with hearing loss (HL) and parents of children with normal hearing in parent and child behaviors during SBR. Participants were presented with age appropriate storybooks and the parent-child interactions were videotaped and all parent and child speech, vocalizations and behaviors were coded. The parent SBR behaviors coded were engagement, usage of literacy strategies, teacher techniques, and interactive reading. The child SBR behaviors coded included engagement, interactive reading, and guided reading. We found that parents of children with and without HL demonstrate similar SBR behaviors, but that parents of children with HL perceive their child's enjoyment of SBR lower than parents with children with NH. It was also found that children with NH demonstrate more interactive reading and guided reading behaviors than children with HL. NH children also relate the book to personal experiences, offer more spontaneous ideas, and demonstrate more overall enjoyment than children with HL during the SBR interactions.

Title: Elucidation of the Native Structure and Cyclic Linkage of LamD558, a Signaling Peptide from Lactobacillus Plantarum
Students: Ashlyn Cantrel
Advisor: Dr. Michael Bertucci

Lactobacillus plantarum is a beneficial bacterium that is essential to human gut health. The chemical signal that L. plantarum uses to communicate in its quorum sensing circuit is a five amino acid cyclic peptide, LamD558. The recognized native structure of LamD558 is a thiolactone, but we believe that there is potential for the peptide to undergo an intramolecular S to N acyl shift to form a lactam. Lactam derivatives of LamD558 were synthesized utilizing Fmoc based SPPS and purified to homogeneity via HPLC. These derivatives will be tested against the native peptide in a cell adherence assay. The results of the cell adherence assay can then be used to determine structure activity relationships for LamD558. These SARs will be used to rationally design an enhanced agonist.

Title: Expanding the Determinants of Health to Incorporate Rule of Law and Sociolegal Needs
Students: William Pelletiers
Advisor: Dr. James Teufel

The most recent wave of public health has broadly focused on the social determinants and the culture of health as opposed to the previous waves that focused on clinical and lifestyle approaches to population health (Davies, et al., 2014). There is an emerging research based that documents the statistical correlation between civil justice and health at an individual and ecological level (Teufel and Mace, 2015; Tobin Tyler and Teitelbaum, 2018). The current study used a brief survey and in-person administration in priority community-based organizations in an attempt to replicate and extend the work of the Middle-City study. Of the 681 survey respondents, approximately 75% reported at least one civil legal issue within the last 18 months. The most commonly reported issues were income-related. Overall, the mean average number of civil legal needs reported was 2.7 per respondent and the median average was 2 per respondent. Combining population poverty estimates and civil legal need findings from the current report, it is estimated that between 81,479 and 184,059 households in Northeastern Pennsylvania will have at least one civil legal problem in the next 18 months.

Title: **Assessment of Prescribed Burnings at Lehigh Gap Wildlife Refuge**
Students: Chris Sorich
Advisor: Dr. Diane Husic

Emissions from two former zinc smelters that operated for almost a century destroyed the vegetation along a section of the Appalachian Mountain range in Palmerton, PA. Due to substantial deposition of acid and heavy metals, parts of the area were designated as a Superfund site and placed on the National Priorities List by the United States Environmental Protection Agency. Vegetative cover was reestablished using soil amendments and large-scale seeding of warm-season native grasses. Although initially successful, project managers have noticed a change in grass coverage over the past few years. To quantify changes in vegetative cover and species abundance, an assessment was conducted measuring biotic coverage and plant diversity that showed a decrease in grass coverage over time. Plot comparison suggests this may be a natural process expedited by controlled fire disturbances that allows other plants to compete with the pre-existing grass community. While total vegetative cover has remained the same, the community balance of plants has changed; suggesting that parts of the LGWR are experiencing a gradual ecological succession. The results of this study will guide future land management decisions at the site and provide insights into whether soil amendments or reseeding is needed.

Title: **Synthesis of a Novel Dirhodium Compound as a Targeted Anti-tumor Agent**
Students: Andrew Bainbridge
Advisor: Dr. Stephen Dunham

Modern chemotherapy drugs are a mainline defense in the fight against cancer. These drugs function by targeting and disabling fundamental aspects of cellular processes. But there is a serious issue with this method of action: Many of these drugs do not specifically target tumor cells. These drugs will attack cells at random, causing numerous life-threatening side effects. Cisplatin--which contains a platinum metal ion--is an example of a non-targeted, FDA approved, anti-tumor drug. The goal of this project is to design and synthesize a targeted anti-tumor compound, using dirhodium acetate, to replace the platinum core of transition-metal-based anti-tumor drugs. Several attempts have been made to synthesize such a compound, and the preparation, purification, and characterization of these attempts with various targeting groups will be presented.

Title: **Fragment Alignment Analysis in Post Collision Dynamics**
Students: Bryan Harvey
Advisor: Dr. Kelly Krieble

After a projectile nucleus collides with a target nucleus, it becomes an excited projectile like fragment (PLF) which often breaks apart further into two more fragments, F1 and F2. In nuclear collisions, the angular alignment between F1 and F2 has potential value in making predictions about the timescale of neutron-proton equilibration. This research compares four methods for determining the angular alignment in simulated nuclear collisions.*

Title: **Understanding the Learned Conceptions of Writing that First-Year Students Bring to College**
Students: Gabrielle Stanley
Advisor: Dr. Crystal Fodrey

All incoming first-year students complete a summer assignment, including an introductory "letter to the professor." They have to answer a couple questions in that letter, include one along the lines of "How do you define good writing? What is a piece of "good writing" that you composed? What was the writing process involved in composing that piece?" The Writing at Moravian program is supposed to receive all of these responses, but not every student sends their assignment both to WAM and their professor. As a result, Gabrielle was given access to 221 of these responses. She coded them on atlas.ti to look for patterns, and compared students' ideas of good writing to the necessary habits of mind outlined in the Framework for Success in Postsecondary Writing.

Title: **Socio-Economic Analysis of Satellite Observations to Predict Cholera**
Students: Nathaniel Rhoads
Advisor: Dr. Sonia Aziz

The goal of our project is to analyze the relationship between various socio-economic characteristics of Bangladeshi individuals and the individuals' willingness to pay (WTP), or value, for a cholera vaccine. WTP for the vaccine for both the individual and the individual's child were estimated. Based on a sample of nearly 1000 individuals, we found that several socioeconomic factors, such as income and number of household members, affect WTP for a cholera vaccine for both the individual and the individual's child. This project is part of a larger goal of testing individual's WTP for an early warning system for cholera.

Title: **A Comparison Between Perceived Physical Activity and Actual Physical Activity in Community Dwelling Older Adults**
Students: Kelly Gonoude
Advisor: Dr. Donna Keeler

The physiological process of aging negatively impacts function. Physical activity has been shown to slow down the process of aging. Maintaining physiological function through physical activity promotes health and allows an aging individual to live independently. The aim of this study is to measure perceptions of physical activity compared to actual physical activity in community-dwelling older adults. Those older adults who perceive themselves as active appear to be healthier than those who perceive themselves to be inactive. This pilot study involving healthy community dwellers who are 60 years of age or older compares a participant's perceived physical activity to their actual physical fitness. The scores of the Physical Activity Scale for the Elderly questionnaire measures perceived physical activity and will be compared to component scores of the Senior Fitness Test, which measures actual physical fitness. The results of this study will give participants the opportunity to be informed about their perceived physical activity vs. their actual physical fitness. Knowing the results of their assessments could alert older adults about their functional abilities and may allow them the opportunity to increase their physical activity.

Title: **Synthesis of Peptide-Based Quorum Sensing Modulators for S. pneumoniae**
Students: Alec Buttner, Emilee Engler
Advisor: Dr. Michael Bertucci

Quorum sensing in Streptococcus pneumoniae is a cell-density dependent form of bacterial communication that can result in the bacteria's ability to resist antibiotics, form biofilms, and increase pathogenic properties. Through the modification of the amino acids that comprise the quorum-sensing signaling peptide, Competence Stimulating Peptide 1 (CSP1), a more competitive, synthetic peptide may be created to inhibit quorum sensing in S.

pneumoniae. In this study, two independent approaches are being undertaken: modifying select positions on the hydrophobic face of the peptide to optimize binding, and combining multiple substitutions while replacing a single glutamic acid residue shown to activate quorum sensing to develop quorum sensing inhibitors. Peptides are being created through Solid Phase Peptide Synthesis, purified through HPLC, and analyzed through MALDI-TOF. Both of these approaches seek to increase binding efficiency of a synthetic peptide to out compete the natural CSP1 and block the bacteria's ability to initiate quorum sensing.

Title: **What Rhodium Compounds Will Kill Cancer Cells?**
Students: Jared Miller
Advisor: Dr. Shari Dunham & Dr. Anastasia Thevenin

Transition metal compounds have much potential for use as chemotherapies in the treatment of cancer. Platinum-containing compounds such as cisplatin are able to bind covalently to DNA and form damaging adducts that lead to cell death. Prior research has shown that dirhodium compounds exhibit a similar ability to covalently bind to DNA and form stable adducts. However, little is known about the cytotoxicity of these compounds. This research explores the cytotoxicity of two commercially available rhodium compounds, Rh2(AcO)4 and Rh2(TFA)4, as well as one synthesized by the Dunham lab at Moravian College, Rh2(AcO)3(TFA). Cytotoxicity was measured through the use of MTT assays for all three compounds. These data suggest that both Rh2(AcO)4 and Rh2(AcO)3(TFA) are most effective at treatment concentrations above 100 μM. Rh2(TFA)4 does not exhibit significant cytotoxic effects at treatment concentrations up to 250 μM. This evidence is important for further understanding what derivatives of these dirhodium compounds may exhibit cytotoxic effects in future studies.

Title: **GC-MS and HPLC Analysis of SPME Water Extracts**
Students: Jade Powers
Advisor: Dr. Alison Holliday

The purpose of this research is to quantify a common water pollutant, toluene, using various instrumental methods which deviate from typical techniques. Toluene was first quantified using headspace analysis with a SPME Fiber (Solid Phase Microextraction), and the analyte was analyzed through thermal desorption of the fiber into the GC-MS. This is the common method used, and toluene was successfully detected from this headspace analysis. Standard solutions were used to quantify the total amount of toluene extracted by the fiber. In order to quantify toluene using HPLC after SPME extraction, a simple solvent desorption step was designed. To confirm that all the toluene was removed from the fiber in this process, a sample of the methanol was injected into the GC-MS. Follow-up work on detection with HPLC is ongoing.

Title: **Kinematics of Prey Capture, Manipulation, and Swallowing in Asian Vine Snakes**
Students: Em Adam, Tevo'n Campbell
Advisor: Dr. Frances Irish

Snakes swallow prey whole using unilateral jaw movements (independent movement of the jaws on either side of the head). Because the snout is movably attached to both braincase and jaws, unilateral jaw movements cause the snout to rotate relative to the braincase. Previous student projects revealed surprisingly high variation in snout rotation between species of boas and pythons (maximum of 9 degrees in Lichanura to 60 degrees in Boa constrictor). We studied prey capture, manipulation, and swallowing in Asian Vine Snakes (Ahaetulla prasina and A. nasuta), which are phylogenetically distant from boas and pythons and have different habits and skull

morphology. Six specimens were observed in individual aquaria simulating their arboreal environment as closely as possible. We used high speed digital video to record prey capture at 500 frames/second and high definition digital video to record prey manipulation and swallowing at 60 frames/sec. Snout twisting was measured using Tracker software. Our data indicate that Ahaetulla has a highly mobile snout, twisting a maximum of 67 degrees during swallowing, similar to values found in Boa constrictor, and higher than in any other species recorded.

Title: **Musical Interpretation Through Machine Learning**
Students: Charles Peeke
Advisor: Dr. Jeff Bush

There is a level of comfort needed in order to fully comprehend the musical process behind writing, playing, and recording music. The deterministic process that humans go through in order to recognize differences in instruments comes naturally. Through the use of computer science, we strive to better understand the world of music and provide a new perspective to explain it to others. Through the use of machine learning, computer programs may be able to recognize different notes and rhythms, and create written music of various instruments to bridge the gap of playing music freely into written music.This project focuses on the distinct factors that various instruments have when producing the same musical note. Each instrument produces a different ratio of harmonic frequencies per note and provides a basis for the determining factors of different instruments

Title: **Synthesis and Characterization of a Novel Dirhodium Complex**
Students: Jessica McCormick
Advisor: Dr. Stephen Dunham

Metal ions are fundamental parts of cells chosen to work in imperative biochemical processes. Due to a metals reactivity, they are closely regulated under normal conditions and eccentric metal ions are associated with pathological disorders and diseases. Metal-based compounds have been used for chemotherapy. Rhodium is one of these potential metal-chemotherapeutics. This research is aimed at improving and developing new rhodium-based compounds. Dirhodium(II) tetraacetate dimer, Rh2(OAc)4, was used to synthesize a new rhodium complex that replaced one acetate with citric acid to form Rh2(OAc)3cit. The new compound was purified from the reaction mixture using high performance liquid chromatography (HPLC) and its structure was characterized using nuclear magnetic resonance (NMR) spectroscopy. The new compound will be used for DNA binding and cellular toxicity studies to determine its chemotherapeutic potential compared to Rh2(OAc)4.

Title: **Post-Election Violence in Africa: 1990 - 2017**
Students: William Pelletiers
Advisor: Dr. Faith Okpotor

What accounts for the incidence of post-election violence (PEV) in Africa? Previous studies have linked such factors as greed and grievance, ethnic tensions, and manipulative identity politics to internal conflict. Studies on electoral violence on the other hand have focused mainly on individual cases, its use by political parties to perpetuate power, or the role of violence prevention strategies in ameliorating the intensity of electoral violence. However, neither the internal conflict nor electoral violence literatures have addressed the sources and causes of post-election violence in the aggregate. This project is the first step in that direction. We created an original data set of national elections in Africa from 1990 – 2017 after the third-wave of democracy. Descriptive analysis shows that most episodes of PEV occurred in 2005, most national elections were held in 2011, and the majority of

elections were held in countries that had experienced previous violence episodes. Additionally, most democracies in Africa are younger than 4 election cycles, while the oldest democracies have made it to their 11th cycle of elections. Understanding the environment which breeds violence following a contested election outcome is crucial to coming up with ways to mitigate it.

Honors Candidates 2018-2019

Rocco Beltrami
Advisors: Drs. John Reynolds and Akbar Keshodkar
Political Science
The 21st Century Citizen: Direct Democracy in the Digital Age

Katie Boyle
Advisor: Dr. Joshua Lord
Environmental Science
Prolonged Effects of Ocean Acidification on Callinectes sapidus

Ashlyn Cantrel
Advisor: Dr. Michael Bertucci
Chemistry
Elucidation of the Native Structure and Cyclic Linkage of LamD, a Signalling Peptide from Lactobacillus plantarum

Kylie Chichura
Advisor: Dr. Michael Bertucci
Chemistry
The Effects of Multiple Amino Acid Mutations of a Key Quorum-sensing Peptide, CSP-1

Matthew Conners
Advisors: Drs. Ruth Malenda and Kelly Krieble
Physics
Investigating the Mechanical and Thermodynamic Quantities of a Near Elastic Collision

Sydney Costenbader
Advisor: Dr. Daniel Proud
Biology
All Wrapped-up: Prehensility and the Tarsal Flexor System in the Legs of Harvestmen (Arachnida: Opiliones: Eupnoi)

Marissa Cusimano
Advisor: Dr. Anastasia Thévenin
Biochemistry
Do MAP Kinases (MAPKs) Regulate Tumor-suppressive Functions of Gap Junctions?

Adriana Facchiano
Advisor: Dr. Cecilia Fox
Neuroscience
The Neuroprotective Effect of Curcumin in the Striatal 6- Hydroxydopamine Model of Parkinson's Disease

Kyle Froehlich
Advisor: Dr. Joshua Lord
Biology

Nonlethal Predator Effects on Snails Under Ocean Acidification Conditions

Michael Gallo
Advisor: Dr. Anastasia Thévenin
Biochemistry
Antiproliferative Effects of Gap Junction Protein Delivery to Glioma Cells Utilizing a Cancer-targeting Peptide

Austin Grace
Advisor: Dr. Daniel Proud
Environmental Science
Biomagnification of Heavy Metals in Spiders and Their Prey

Bryan Harvey
Advisor: Dr. Kelly Krieble
Physics
Time Scale of NZ-Equilibration Related to Alignment Angle in Nuclear Dynamics

Alayna Koch
Advisor: Dr. Kara Mosovsky
Biology
Microbiome Analysis of Soil from Palmerton Zinc Pile Superfund Site

Jonathan Nadraws
Advisor: Dr. Michael Bertucci
Chemistry
Developing Biological Assays to Determine Structure Activity Relationships of Derivatives of LamD, a Signalling Peptide from Lactobacillus plantarum

Charles Peeke
Advisor: Dr. Jeffrey Bush
Computer Science
Musical Interpretation through Machine Learning

Madison Pursell
Advisors: Drs. Alison Holliday and James Teufel
Chemistry
Analysis of Legal and Illicit Opioid Use in the Lehigh Valley

Nathaniel Rhoads
Advisor: Dr. Sonia Aziz
Economics
Socio-economic Analysis of Satellite Observations to Predict Cholera

Mia Romfo
Advisor: Dr. Virginia Adams O'Connell
Sociology
Mental Health Care Services in American Prisons: Assessing Efficacy and Sufficiency

Erika Salus
Advisors: Angela Fraleigh and Dr. Kelly Denton-Borhaug
Studio Art/Peace and Justice Studies
Art as a "Weapon" for Social Change

Ellyn Siftar
Advisors: Angela Fraleigh and Dr. Leon Niemoczynski
Art/Philosophy
Ecstatic Art

Christopher Sorich
Advisor: Dr. Diane Husic
Biology
Zinc and pH Effects on the Germination of Seeds

Katelyn Snyder
Advisor: Dr. Nicole Tabor
English
Alienating Kinship in Silko's Ceremony, Baldwin's Giovanni's Room, and Danticat's Breath, Eyes, Memory: A Survey of 19th and 20th Century Literature

Vaughn Tempesta
Advisors: Drs. Ruth Malenda and Robert LaRue
Physics/Queer Theory
The Fear of a Queer Universe: A Multi-dimensional Analysis

Eliana Zebro
Advisor: Dr. Larry Lipkis
Music Composition
The Composition of a Ballet or Modern Dance Piece Based on Osamu Dazai's Novella Schoolgirl & A Study of Traditional Japanese Theatre & Dance

Honors Candidates Spring 2019-Fall 2019

Steven Berger
Advisors: Drs. Nathan Shank and Gregory Schaper
Mathematics
Using Curve Fitting to Analyze Music Scores

Irene Bonetti
Advisor: Dr. Anastasia Thévenin
Biochemistry
Understanding the Role of Phosphorylated Connexin 43 Gap Junctions in the Recruitment of Src Oncogene in Glioma Cells

Emily Sangirardi
Advisor: Dr. Joel Nathan Rosen
Communications and Media Studies
The Impact of Pornography on Social Networking Sites (SNS) and Personal Relationships

Sara Yitzchaki
Advisor: Dr. Akbar Keshodkar
Sociology
Assessing Stigma within the Experience of Alcoholic Anonymous (AA) Members

2018 SOAR Summer Research Fellows

Socio-Economic Analysis of Satellite Observations to Predict Cholera
Nathaniel Rhoads & Dr. Sonia Aziz

The Effects of Multiple Amino Acid Mutations of a Key Quorum Sensing Peptide, CSP-1
Kylie Chichura & Dr. Michael Bertucci

Australian Aboriginal Music: Exploring the Influence of Australian Politics, Biology, Environment and History on Aboriginal Music and Storytelling
Co-sponsored by the Center for Global Education
Lauren Steinert, Dr. Hilde Binford, & Ms. Suzanne Kompass

Exploring a Collaborative Feedback System: Portability in the Field and the Causal Impact of Feedback Utility
Julia DeMarco & Dr. Robert Brill

Responsive Shared Book Reading and Early Literacy Skills in Four-Year Olds: A Summer Reading Experience
Co-sponsored by the Center for Intercultural Advancement and Global Inclusion
Gabriella Nasta & Dr. Jean DesJardin

DNA Binding Rates and Cytotoxicity of Rhodium Compounds
Miles Lizak, Dr. Shari Dunham, & Dr. Anastasia Thevenin

Chemical Modification of a diRhodium Complex with a Steroid as a Targeting Molecule for Cancer Cells
Andrew Bainbridge & Dr. Stephen Dunham

Toward Curricular and Pedagogical Innovation of the Teaching of Writing in Local High Schools
Gabrielle Stanley & Dr. Crystal Fodrey

The Neuroprotective Effect of Curcumin in the Striatal 6-Hydroxydopamine Model of Parkinson's disease
Adriana Facchiano & Dr. Cecilia Fox

Monitoring of Prescribed Burn Areas at the Lehigh Gap Nature Center (LGNC)
Christopher Sorich & Dr. Diane Husic

Shadows Seaching for Light
Erika Salus, Jillian McLuhan, & Ms. Angela Fraleigh

The Underrepresentation of Teachers of Color: Using Narrative Inquiry to Address the Imagination Gap
Ellyce Nieves & Dr. Tristan Gleason

Evaluating How Nature Experiences Help Us Thrive
Adrianna Mantz, Noah Reiss, & Dr. Dietlinde Heilmayr

Drug Analysis of Wastewater Using Gas Chromatography-Mass Spectrometry
Madison Pursell & Dr. Alison Holliday

Kinematics of Prey Handling in Arboreal Snakes
Co-sponsored by the Center for Global Education
Emma Adam, Tevo'n Campell, & Dr. Frances Irish

Effects of Seizure Susceptibility on a Complex Behavior in Drosophila melanogaster
Robert Scheirer & Dr. Christopher Jones

How Does Ocean Acidification Affect Mussel Growth and Defense?
Katie Boyle & Dr. Joshua Lord

Microbiome Analysis of Soil from Palmerton Zinc Pile Superfund Site
Alayna Koch & Dr. Kara Mosovsky

Assessing Arachnid Diversity at the Lehigh Gap Wildlife Refuge
Austin Grace & Dr. Daniel Proud

Building Community in the Kitchen: A Bethlehem Cookbook
Corinne Philbin & Mr. Christopher Shorr

Estimating the Intersection of Civil Justice and Health: What are the Social Benefits of Civil Justice
Co-sponsored by the Center for Intercultural Advancement
Michael Gallo & Dr. James Teufel

Understanding the Role of Phosphorylation in Tumor-suppressive Function of Gap Junctions
Irene Bonetti & Dr. Anastasia Thevenin

Student Conference Presentations 2018-2019

Jaime Ernst
Collaborative Multimodal Strategies to Empower Multilingual Literacy Development
Mid-Atlantic Writing Centers Association Conference
March 23, 2019
Advisor: Meg Mikovits

Madison Pursell
Detecting Opioids and their Metabolites in Wastewater
Eastern Analytical Symposium, November 13, 2018
Advisor: Dr. Alison Holliday

Mikayla Jucewicz and Toshiana Figueroa
Noise Exposure and Hearing Conservation among LVAIC students
Pennsylvania Speech-Language and Hearing Association Convention, Lancaster, PA, April 11, 2019
Advisor: Dr. Monica Kaniamattam

Heylis Solano, Victoria Urquiza, and Erika Zárate.
Mid Atlantic Council on Latin American Studies annual conference, SUNY Stony Brook University, Long Island, NY, March 8, 2019
Advisor: Dr. Franca Roibel Fernandez

Adriana Facchiano
The Neuroprotective Effects of Curcumin in the 6-Hydroxydopamine Striatal Model of Parkinson's Disease
Society for Neuroscience Conference, November 5, 2018
National Conference on Undergraduate Research (NCUR), April 12, 2019
Lehigh Valley Society for Neuroscience Undergraduate Research Conference, April 27, 2019
Advisor: Dr. Cecilia M. Fox

Vaughn Tempesta
Physics: Fear of a Queer Universe, A Multidimensional Analysis
National Conference on Undergraduate Research
April 10 – April 13, 2019
Advisors: Drs. Robert LaRue and Ruth Malenda

Gabriella Nasta
Parents' Communication Strategies while Reading to their Preschool Children with Hearing Loss
Division of Early Childhood Conference, Orlando, FL, October 2018
Advisor: Dr. Jean DesJardin

Gabrielle Stanley
Understanding the Learned Conceptions of Writing that First-Year Students Bring to College
National Convention on College Composition and Communication, Pittsburgh, PA, March 14, 2019
Advisor: Dr. Crystal Fodrey

Steven Berger
The Mathematics of 20th Century Music
Moravian Undergraduate Mathematics Conference
Advisors: Drs. Shank and Schaper

Sydney Costenbader
All wrapped up: prehensility and the tarsal flexor system in the legs of harvestmen (Arachnida: Opiliones: Eupnoi).
Pennsylvania Academy of Sciences, March 30, 2019
Advisor: Dr. Daniel Proud

Marissa Cusimano
Do MAP Kinases (MAPKs) Regulate Tumor Suppressive Functions of Gap Junctions?
2019 Pennsylvania Academy of the Sciences, Cedar Crest College, Allentown, PA, March 29, 2019
Lehigh Valley Molecular and Cell Biology (LVMCB) Symposium, Muhlenberg College, Allentown, PA, April 16, 2019
Incorporating Advocacy in Brain Awareness Service Learning Programs Using a Liberal Arts Approach.
Society for Neuroscience National Conference, November 2018

Irene Bonetti:
Mutually Exclusive Interactions of Connexin 43 Gap Junctions with Src and Zona Occludens-1 (ZO-1) are regulated through phosphorylation.
March 29th, 2019 Pennsylvania Academy of the Sciences, Cedar Crest College, Allentown, PA, March 29, 2019
Lehigh Valley Molecular and Cell Biology (LVMCB) Symposium, Muhlenberg College, Allentown, PA, April 16, 2019

Annual Meeting of the Eastern Psychological Association, NYC, February 28 - March 2, 2019

Adrianna Mantz
The relationship between nature features and changes in health
Advisor: Dr. Dietlinde Heilmayr

Hailee Yoder
Monetary spending in acts of kindness and well-being
Advisor: Dr. Dietlinde Heilmayr

Noah Reiss
The relationships between interpersonal engagement, life satisfaction, and meaning in life
Advisor: Dr. Dietlinde Heilmayr

Julian Phipps
Emotions in the Workplace: An Exploratory Study
Advisor: Dr. Robert Brill

Hunter Runge, Crystal Yautz, Sarah DeFranco
Perceptions of Sexual Assault
Advisor: Dr. Sarah Johnson

Benthic Ecology Meeting, St. John's, Newfoundland and Labrador, April 3 - 6, 2019

Katie Boyle
Ecology of Long-Term Color Change in the Blue Crab *Callinectes sapidus*
Advisor: Dr. Joshua Lord

Katie (Kathleen) Mayer
The Impact of Temperature and Hypoxia on the Success of the Asian Shore Crab
Advisor: Dr. Joshua Lord

Kyle Froehlich
Can Ocean Acidification Interfere with the Ability of Mud Snails (Tritia obsoleta) to Sense Predators?
Advisor: Dr. Joshua Lord

256th American Chemical Society National Meeting and Exposition, Poster Presentation, August 2018

Kylie Chichura
Effects of multiple amino acid mutations of a key quorum sensing peptide, CSP-1
Advisor: Dr. Michael Bertucci

Ashlyn Cantrel
Synthesis of lactam derivatives of LamD, a cyclic signaling peptide of *Lactobacillus plantarum*
Advisor: Dr. Michael Bertucci

American Association of Physics Teachers- Central Pennsylvania Section (AAPT-CPS)
March 29- 30, 2019

Matthew Conners
Investigating the Mechanical Quantities of Inelastic Collisions
Advisors: Drs. Kelly Krieble and Ruth Malenda

Vaughn Tempesta
Physics: Fear of a Queer Universe, A Multidimensional Analysis
Advisors: Drs. Robert LaRue and Ruth Malenda

13th Moravian College Undergraduate Conference in Medieval & Early Modern Studies, December 1, 2018

Jonah Arndt: "Ale Spoilage in Medieval England."

DeAnna Stocker: "Medieval Bread."

Shianne Reimer: "Priests Behaving Badly."

Giovanni Suvire: "Networks and Relationships in English Manorial Courts."

Chris Brennan: "Geographic Dispersion of Medieval Soldiers."

Anthony Orlando: "Imagery of Peasants: Stereotypes to Idyllic."

Advisor: Dr. Sandy Bardsley

Max Kraft: "'Wyrdwriteras' and Ælfrician Ideas of Anglo-Saxon Kingship."

Elizabeth Horn: "Heroic vs. Chivalric: Medieval Codes for Warriors."

Christine Wieder: "Women's Empowerment and Restriction in Medieval Literature."

Group panel: "Mapping Early Modern England" by Erin Anagnost, Eda Turkdonmez, Jennifer Khawam, & Emma Hutchman.

Advisor: Dr. John Black

8th Reconstructive and Experimental Archaeology Conference, Colonial Williamsburg, October 18 - 20, 2018

Katelyn Snyder: "The Case for Experiential Archaeology"

Brenden Malloy: "The Case for a Scientific Approach"

Jonah Arndt: "Experience and Experiment in Building a Burdei"

Advisors: Drs. Sandy Bardsley and Jamie Paxton

Other presentations:

Rooney, F., Teufel, J., & Gallo, M. (2019). Legal Incubators: An Innovative Model Working to Bridge the Justice Gap Around the Globe. Presentation at the World Justice Forum VI. The Hague, Netherlands, April 30.

Gallo, M., Gerhart, J., Varshavskiy, A., Thévenin, D., & Thévenin, A. (2019). Antiproliferative Effects of Gap Junction Protein Delivery to Glioma Cell Utilizing a Cancer Targeting Peptide. Poster Presentation at Lehigh Valley Molecular and Cell Biology Annual Meeting and Research Symposium. Allentown, PA, April 16.

Gallo, M., Teufel, J., & Pelletiers, W. (2019). Rule of Law Predicts Global Health Outcomes. Presentation at the Unite for Sight Global Health & Innovation Conference. New Haven, CT, April 13.

Gallo, M., Teufel, J., & Pelletiers, W. (2019). Rule of Law Predicts Global Health Outcomes. Presentation at the National Conference for Undergraduate Research, Kennesaw, GA, April 11.

Gallo, M., Gerhart, J., Varshavskiy, A., Thévenin, D., & Thévenin, A.. (2019). Antiproliferative Effects of Gap Junction Protein Delivery to Glioma Cell Utilizing a Cancer Targeting Peptide. Oral presentation at Pennsylvania Academy of the Science Annual Meeting. Allentown, PA, March 30.

Pelletiers, W., Teufel, J. & Gallo, M. (2019). Undergraduate student-faculty collaborative community-oriented research: Process and Impact. Presentation at the Undergraduate Public Health and Global Health Education Summit, Arlington, VA, March 20.

Sandefur, R., Teufel, J., & Gallo, M. (2019) Attorney Impact on Public Health. Keynote Address at the Consortium for Access to Justice Conference, Salt Lake City, UT, March 15.

Pelletiers, W., Gallo, M. & Teufel, J. (2019). Culture of the rule of law and community sociolegal needs as determinants of health. Presentation at the Harvard College Undergraduate Research Association's National Collegiate Research Conference, Cambridge, MA, January 26.

Gallo, M. (2019). Justice and Health in the United States and Mexico. Presentation at Centro de Estudios Superiores de Tepeaca Segundo Foro. Tepeaca, Mexico, January 17.

Gallo, M., Pelletiers, W. & Teufel, J. (2018). Ecological associations of justice and health: An international comparison. Presentation at 1st Annual Data Science and Computer Science Showcase. Bethlehem, PA. September 14.

Gallo, M., Pelletiers, W. & Teufel, J. (2018). Justice inequities in the United States predict health outcomes. Presentation at 1st Annual Data Science and Computer Science Showcase. Bethlehem, PA. September 14.

Gallo, M., Pelletiers, W. & Teufel, J. (2018). Economic Benefits of Legal Aid. Presentation at 1st Annual Data Science and Computer Science Showcase. Bethlehem, PA. September 14.

Gallo, M., Pelletiers, W. & Teufel, J. (2018). Access to justice predicts population health in the United States. Presentation at the Landmark Conference Summer Research Symposium, Huntingdon, PA, July 26.

Gallo, M., Pelletiers, W. & Teufel, J. (2018). Civil legal aid participation improves income and decreases poverty among women experiencing intimate partner violence. Presentation at the Landmark Conference Summer Research Symposium, Huntingdon, PA, July 26.

Gallo, M., Pelletiers, W. & Teufel, J. (2018). Rule of law predicts global health outcomes. Presentation at the Landmark Conference Summer Research Symposium, Huntingdon, PA, July 26.

Pelletiers, W., Gallo, M. & Teufel, J. (2018). Evaluating access to justice in Northeastern Pennsylvania. Presentation at the Landmark Conference Summer Research Symposium, Huntingdon, PA, July 26.

Senior Art Thesis Exhibition Students

Abrachinsky, Cody

Alawad, Rathath

Alenezi, Kheloud

Alnahari, Dina

Behrle, Alecia

Bertholf, Kristin

Burns, Amanda

Casolaro, Mattison

Espino, Alexander

Gabrielle Fatulla

Hilal, Asrar

Miller, Lejeune

O'Hanley, Caitlin

Osman, Anna

Raboui, Hadeel

Rader, Kristin

Sahli, Abdulaziz

Salus, Erika

Siftar, Ellyn