



# MORAVIAN COLLEGE

## The 12<sup>th</sup> Annual Student Scholarship and Creative Endeavors Day

April 19, 2017

This year, 57 students, representing 24 different areas of study, are participating in the 2017 Scholars Day activities. Congratulations to these student scholars for all of their accomplishments, and many thanks to their 31 faculty sponsors. Since the inception of this event 12 years ago, 766 students have shared their scholarly accomplishments with the Moravian College community.

**The 12<sup>th</sup> Annual Moravian College Undergraduate  
Student Scholarship and Creative Endeavors Day  
April 19, 2017**



**MORAVIAN  
COLLEGE**

**Schedule of Events**

8:00 a.m.	<b>Welcome and Opening Remarks</b> <i>PPHAC 335</i>
8:10 a.m. – 8:45 a.m.	<b>Session I: PPHAC 335, Oral Presentations</b>
8:55 a.m. – 9:50 a.m.	<b>Session II: PPHAC 335, Oral Presentations</b>
10:10 a.m. – 11:15 a.m.	<b>Session III: PPHAC 335, Oral Presentations</b>
11:45 a.m. – 12:45 p.m.	<b>Student Poster Presentations I</b> <i>Hauptert Union Building, Gallery</i>
1:10 p.m. – 2:25 p.m.	<b>Session V: PPHAC 335, Oral Presentations</b>
2:35 p.m. – 3:30 p.m.	<b>Session VI: PPHAC 335, Oral Presentations</b>
4:00 p.m. – 5:00 p.m.	<b>Student Poster Presentations II</b> <i>PPHAC ATRIUM</i>
12:00 p.m. – 4:00 p.m.	<b>Senior Art Exhibits, Payne Art Gallery – South Campus</b>
<b>4:00 p.m. Reception (All Welcome), PPHAC ATRIUM</b>	

The 12<sup>th</sup> Annual Moravian College Undergraduate Student Scholarship and Creative Endeavors Day  
*Program Overview*

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

**8:00 AM: Opening Remarks – PPHAC 335**

**SESSION I**

Oral Presentations			
Session I: Moderator – Dr. Nathan Shank PPHAC 335			
8:10 AM	Steven Berger <i>The Harmonious Sounds of Mathematics</i>	Computer Science, Mathematics	Dr. Nathan Shank, Dr. Greg Schaper
8:30 AM	Quay Matyus, Adel Sharif <i>Monocacy Creek Water Chemistry</i>	Biology	Dr. Frank Kuserk

**SESSION II**

Oral Presentations			
Session II: Moderator – Dr. Jane Berger PPHAC 335			
8:55 AM	Gabrielle Marotta <i>Emblematic Criticism of the “Christian Judge” in Fuenteovejuna (1619) by Lope de Vega</i>	Spanish	Dr. Claudia Mesa
9:15 AM	Eric Yeakel <i>The Messianic Secret in Mark: Theology, History, or Both?</i>	Religion	Dr. Kelly Denton-Borhaug
9:35 AM	Brielle Popolla <i>Moravian College in the 1960's</i>	History	Dr. Jane Berger

**SESSION III**

Oral Presentations			
Session III: Moderator – Dr. Bernie Cantens PPHAC 335			
10:20 AM	Matthew Jones <i>The Ethics of Abortion</i>	Ethics	Dr. Bernie Cantens
10:40 AM	Niki Maffettone <i>Think Before You Drink</i>	Peace and Justice	Dr. Daniel Jasper, Dr. Kelly Denton-Borhaug
11:00 AM	Shane Hansen <i>The Development of 0 Through 9</i>	History, Philosophy, Mathematics	Dr. Shannon Talbott

## SESSION V

Oral Presentations			
Session V: Moderator – Christopher Shorr			
PPHAC 335			
1:10 PM	Makenna Masenheimer, Melissa Gustafson, Corinne Philbin, Dalton Hornberger, Alexander Pena <i>Devised Theatre..and "Stuff"</i>	Theatre	Christopher Shorr
1:30 PM	Emily Miller <i>The Nature and Quality of Friendships Among College Students: A Focus on Greek Life</i>	Psychology	Dr. Michelle Schmidt
1:50 PM	Michelle Pomposello <i>How Do Sand Boas Capture Prey They Cannot See?</i>	Biology	Dr. Frances Irish
2:10 PM	Shelby Does <i>Painted Turtle Nest Predation and Inter-Pond Migration: Spatial Ecology at the Lehigh Gap Nature Center</i>	Environmental Science	Dr. Frank Kuserk

## SESSION VI

Oral Presentations			
Session VI: Moderator – Dr. Patrick van Esch			
PPHAC 335			
2:35 PM	Katie DeVito Erhart <i>Presentation of Self on College Campuses: Is There a "Traditional" Gender Display Reward?</i>	Sociology	Dr. Virginia Adams O'Connell
2:55 PM	Alyssa Torrisi <i>The Effects of Extracurricular Engagement on Self-Efficacy in Leadership Ability: A Study of Women in the Workplace</i>	Business Management	Dr. Patrick van Esch
3:15 PM	Loukya Kanakamedala <i>The Neuroprotective Potential of Curcumin in the 6-Hydroxydopamine Rat Model of Parkinson's Disease</i>	Neuroscience	Dr. Cecilia Fox

## POSTER SESSION I

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

Students	Advisor
Magdalene Striluk <i>Autonomous Weapon Systems: Is a Space Warfare Manual Required?</i>	Dr. Patrick van Esch
Swathi Kanakamedala <i>DNA Crosslinking by Rhodium Compounds</i>	Dr. Shari Dunham
Katherine Corcoran, Breanna Deemer <i>College Student Future Work Stress Expectations: Does Maslow's Hierarchy Hold Up?</i>	Dr. Robert Brill
Lowell Perkins <i>Satellite Cholera Outbreak Prediction and Household Willingness to Avoid Cholera</i>	Dr. Sonia Aziz
Eric Morton <i>The Effects of Caffeine on Memory and Recall</i>	Dr. Randolph Smith
Ray Morales, Josh Levano <i>Extreme Kinesis: A Comparative Study of Prey Handling in Snakes</i>	Dr. Frances Irish
Amanda Miller <i>Polyproline Folding: The Effect of Chain Length and Interactions</i>	Dr. Alison Holliday
Matthew Pring <i>Color of Law: The Complexities of Power. A Case Study of Police Brutality Against African Americans.</i>	Angela Fraleigh
Devon Vukovich <i>Deletion Games Played on Paths</i>	Dr. Nathan Shank
Gautam Kanakamedala <i>Mapping a Novel Bang-Sensitive Gene in Drosophila melanogaster</i>	Dr. Christopher Jones
Jenifer Hathaway <i>Modern Propaganda</i>	Angela Fraleigh
Theresa Blumberg <i>Salt in Chips</i>	Dr. Carl Salter
Jon Raso, Amanda Hadeed <i>Do Adaptations for Burrowing Restrict Snout Mobility in Sand Boas?</i>	Dr. Frances Irish
Emily Miller <i>Friendship, Victimization, and Peer-Interactions Among School Aged Children Home life and Mental Health</i>	Dr. Michelle Schmidt
Jonathan Le <i>The Synthesis of Alanine-Substituted LamD Derivatives of Lactobacillus Plantarum</i>	Dr. Michael Bertucci
Austin Mates <i>Synthesis of Rhodium-DNA Model Complexes</i>	Dr. Stephen Dunham

## POSTER SESSION II

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

Students	Advisor
Crystal Collins <i>Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Model</i>	Dr. Kara Mosovsky
Meeghan Rossi <i>Glycoalkaloids and False Potato Beetles</i>	Dr. Alison Holliday
Jessica Lynch <i>Establishing Preliminary Relationships Between Peptide Structure and Quorum Sensing Activity in Bacillus Cereus</i>	Dr. Michael Bertucci
Chris Hassay <i>Utilizing Faculty Interviews as an Epistemological Tool Throughout a Modified Writing-Enriched Curriculum Process at a Small Liberal Arts College</i>	Dr. Crystal Fodrey
Kristin Shean <i>A Proposed Metacognitive Tutoring Program Between Individuals with Autism Spectrum Disorder</i>	Dr. Sarah Johnson, Dr. Robert Brill
Nina DePalma <i>Are We Truly the Land of the Free? Mass Incarceration, Prison Reform, and the MacArthur Foundation</i>	Dr. Virginia Adams O'Connell
Meg Brockett <i>College Athletes: A Nursing Perspective on Challenges and Outcomes in Athletes with Eating Disorders</i>	Dr. Pamela Adamshick
Ana Bustamante <i>Reaction Rates of Novel Rhodium Compounds with Duplex DNA</i>	Dr. Shari Dunham
Robert McKinley <i>Quantification of Misaligned Carapace Scutes in the Painted Turtle, Chrysemys picta</i>	Dr. Frank Kuserk
Gina M Piazza <i>Art and the Sublime</i>	Angela Fraleigh
Jackie Finnegan <i>The Importance of Zoos in Wildlife Conservation</i>	Dr. Frank Kuserk
Kayli Silimperi <i>Alleviating Seizures Using Various Compounds with D. melanogaster</i>	Dr. Christopher Jones
Nathan Nocchi <i>The Dilemma of Divine Foreknowledge and Human Freedom</i>	Dr. Arash Naraghi
Leanna Talotta-Altenburg <i>MALDI Mass Spectrometry Characterization of Rhodium DNA Adducts</i>	Dr. Stephen Dunham
Paige Hart <i>Recapitulating Immuno-Antimicrobial Synergy against Escherichia coli infections</i>	Dr. Kara Mosovsky
Crystal Collins <i>Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Model</i>	Dr. Kara Mosovsky

### Acknowledgements

The 12<sup>th</sup> Annual Moravian College 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 Registrar's Office

## Student Oral Presentations I: PPHAC 335

8:10 - 8:45 AM

Moderator: Dr. Nathan Shank

**Title:** **The Harmonious Sounds of Mathematics**  
**Students:** Steven Berger  
**Advisor:** Dr. Nathan Shank, Dr. Greg Schaper  
**Location:** PPHAC 335 8:10 AM - 8:25 AM

*In this presentation, we will discuss the creation of stochastic harmony in Python and contrast it with music using diatonic harmony. Stochastic music has a strong mathematical basis and was used by a few composers in the late 1800s and early 1900s, most notably by Iannis Xenakis. At the end of the presentation, we will hear what irrational numbers sound like. Join us for some great listening!*

**Title:** **Monocacy Creek Water Chemistry**  
**Students:** Quay Matyus, Adel Sharif  
**Advisor:** Dr. Frank Kuserk  
**Location:** PPHAC 335 8:30 AM - 8:45 AM

*There are a few bodies of water that run close to Moravian College. One of those bodies of water is Monocacy Creek. Not only is Monocacy Creek close to the college, but it also runs around fifty miles within Northampton County and Lehigh County, Pennsylvania. Over the years, many researchers have investigated the water chemistry of Monocacy Creek. During the course of the semester, the water chemistry of six different Monocacy Creek sites were studied to see if different environmental factors affect water chemistry quality.*

## Student Oral Presentations II: PPHAC 335

8:55 - 9:50 AM

Moderator: Dr. Jane Berger

**Title:** **Emblematic Criticism of the “Christian Judge” in Fuenteovejuna (1619) by Lope de Vega**  
**Students:** Gabrielle Marotta  
**Advisor:** Dr. Claudia Mesa  
**Location:** PPHAC 335 8:55 AM - 9:10 AM

*In Lope de Vega’s Fuenteovejuna, the characters of Ferdinand of Aragón and Isabelle of Castile must pronounce judgment for the entire town of Fuenteovejuna after they brutally murder their Commander in retaliation for his abusive treatment. The town folks collectively decide to take the blame for his death and even after investigation, it is still unclear who initiated the killing. As the king states: “This was a serious crime; but since it cannot be verified by written evidence, I cannot choose but pardon it.” In this paper, I examine the significance of Sebastián de Covarrubias’s emblem 97 to suggest that when read in relation to the end of the play, the political statement expressed in the emblem yields thought provoking results. The emblem stresses an ambiguity in the identification of the figure of the “Christian judge,” which represents a key detail to determine the morality of the emblem. Overall, I propose that a reading of Fuenteovejuna through the lens of emblem 97 questions the legitimacy of the Catholic Monarchs since the composition is ambiguous enough to be interpreted as a criticism of their actions in Fuenteovejuna back in 1476.*

**Title:**                   **The Messianic Secret in Mark: Theology, History, or Both?**

Students:               Eric Yeakel

Advisor:                Dr. Kelly Denton-Borhaug

Location:               PPHAC 335

9:15 AM - 9:30 AM

*For many years, scholars have noticed a strange feature in the Gospel of Mark. While Jesus is presented as the messiah, the author of the Gospel goes to great lengths to show that Jesus tried to keep this identity of his hidden. Some of the greatest minds in New Testament scholarship have vigorously debated why this feature is present in Mark's Gospel. Some say it is a theological invention while others say it goes back to the historical Jesus himself. But are these two options mutually exclusive? Does only one of these answers give the full truth? There may be more to the story than meets the eye.*

**Title:**                   **Moravian College in the 1960's**

Students:               Brielle Popolla

Advisor:                Dr. Jane Berger

Location:               PPHAC 335

9:35 AM - 9:50 AM

*Large crowds, students yelling, signs held high, and police everywhere. These are some stereotypes of colleges in the 1960's. But are they necessarily true? Moravian College was both similar and different to the Moravian College students attend today. Through multiple interviews with alumni, research through the school newspaper *The Comenian*, and use of old *Benigna* yearbooks, a story of comparison came together that details what life as a student was truly like at Moravian College in the 1960's.*

### Student Oral Presentations III: PPHAC 335

10:20 - 11:15 AM

Moderator: Dr. Bernie Cantens

**Title:**                   **The Ethics of Abortion**

Students:               Matthew Jones

Advisor:                Dr. Bernie Cantens

Location:               PPHAC 335

10:20 AM - 10:35 AM

*The ethical dilemma surrounding the issue of abortion is fraught with vigorous debate. The typical pro-life and pro-choice arguments for the moral permissibility of abortion focus mainly on one topic, and whether that be the sanctity of life, personhood, or even biological or psychological concepts, does not matter. Instead, what matters is that the traditional arguments, for any of these topics, fail to accurately account for other variables, and therefore do not make for a strong argument for or against abortion. I intend to relay an argument that supports the permissibility of abortion, but only up until the fetus reaches viability, which I will define later. First, I will cover the integral stages of fetal development from conception until birth, while also defining my definition of viability. Second, we will explore the traditional pro-life and pro-choice arguments, and how they fail to account for and provide a sound, scientifically supported argument. Finally, we will explore my reasonings, both philosophical and psychological, as to why I have chosen to defend this position, while also recognizing potential objections. By presenting scientific facts that demonstrate the stages of fetal development, and how that biological development results in the formation of a psychosocial being, I will deliver an accurate, academically supported and fair definition of the ethical requirements for abortion.*

**Title:**                   **Think Before You Drink**

Students:               Niki Maffettone

Advisor:                Dr. Daniel Jasper, Dr. Kelly Denton-Borhaug

Location:               PPHAC 335

10:40 AM - 10:55 AM

*I have created a film that is the culmination of the Peace and Justice Studies Capstone. I am examining the culture of alcohol abuse among student athletes at Moravian, and am directing my focus on the dangers this culture poses for student athletes. As a student athlete myself for the past four years, I am drawing on my own experiences to better understand and explain the alcohol abuse here at Moravian, as well as attempting to answer some questions by implementing interventions, raising awareness, and analyzing ways to help create change to this destructive environment.*

**Title:** The Development of 0 Through 9  
**Students:** Shane Hansen  
**Advisor:** Dr. Shannon Talbott  
**Location:** PPHAC 335 11:00 AM - 11:15 AM

*How were people around the world able to take a philosophical concept and give it a visual representation? Numbers affect every aspect of our daily lives from getting a melt at the B&G to filling your gas tank at the Sunoco down the road. The discussion will show how Greek philosophy and Arabian Algebra merged together to create the number system we use all day every day!*

### Student Oral Presentations V: PPHAC 335 1:10 - 2:25 PM

**Moderator:** Christopher Shorr

**Title:** Devised Theatre..and "Stuff"  
**Students:** Makenna Masenheimer, Melissa Gustafson, Corinne Philbin, Dalton Hornberger, Alexander Pena  
**Advisor:** Christopher Shorr  
**Location:** PPHAC 335 1:10 PM - 1:25 PM

*Cast and crew members of Moravian College Theatre Company's original production, "Stuff," will give insight into the process of creating a piece of devised theatre. How does a multimedia show with original songs, text, movement pieces and huge amounts of "stuff" come to be? Go behind the scenes of the actors', director's and stage manager's unique journeys to sustainability create a show that has a message of sustainability.*

**Title:** The Nature and Quality of Friendships Among College Students: A Focus on Greek Life  
**Students:** Emily Miller  
**Advisor:** Dr. Michelle Schmidt  
**Location:** PPHAC 335 1:30 PM - 1:45 PM

*The current study aims to investigate the possible differences between the quality and nature of friendships within and outside of Greek life. To do this this study looked at students involved in Greek Life and possible differences between their friendships within their organization and outside of their organization. Additionally, students not involved in Greek life were questioned to explore the potential for a different nature of friendship. Both groups were also questioned on their levels of self-esteem. This study was somewhat exploratory in that the constructs of self esteem and friendship are well studied but they have not been well investigated within the context of Greek Life to see if there are indeed differences in the quality and nature of friendships in and outside of Greek Life. Seventy students were surveyed at Moravian College (39 Greek Life students, 31 non Greek Life students). Findings indicate there is indeed a difference in the quality and nature of friendships within and outside Greek Life. Details about specific findings and further implications will be discussed.*

**Title:**                   **How Do Sand Boas Capture Prey They Cannot See?**

Students:               Michelle Pomposello

Advisor:               Dr. Frances Irish

Location:               PPHAC 335

1:50 PM - 2:05 PM

*Eryx colubrinus*, the Kenyan Sand Boa, has a modified snout. Preliminary data on sand boas suggests that during prey capture the anterior tips of the upper jaws are depressed, maximizing tooth exposure in order to snag prey from a position beneath the substrate. How Do Sand Boas Capture Prey They Cannot See? Eleven different specimens were observed within 1 ½ inches of sand in a ten gallon aquarium. Burrowing, prey (live mice) presentation, and prey-strikes were recorded. In contrast to our hypothesis, snakes did not strike from a completely covered position and instead positioned themselves with the top of the head partially exposed. Both prey and snakes remained close to aquarium walls, where most prey captures occurred. To test if *Eryx colubrinus* prefers to wait in scented or unscented areas, a series of experiments consisting of a control unscented group and a group with a region of mouse-scented sand were performed. Snakes from the control group did not stay in one position while those with mouse scent remained still, close to the region where the scent was. This supports our initial hypotheses that *Eryx colubrinus* would position itself at or near the prey-scented region of sand.

**Title:**                   **Painted Turtle Nest Predation and Inter-Pond Migration: Spatial Ecology at the Lehigh Gap Nature Center**

Students:               Shelby Does

Advisor:               Dr. Frank Kuserk

Location:               PPHAC 335

2:10 PM - 2:25 PM

The painted turtle (*Chrysemys picta*) is a common sight in many ponds and waterways across the United States--however, because of anthropogenic changes in landscape, many of these turtles face new challenges in survival. This project aimed to better understand the spatial ecology of painted turtles at the Lehigh Gap Nature Center and to identify locations that may be crucial to the conservation of the site's turtle populations in three geographically ponds. Data collected by trapping and radio tracking established baseline population estimates, and proved that there exists a number of individuals that migrate between the three ponds. Updated population estimates based on this information suggest that the population of painted turtles at this site may be smaller than anticipated. Movement shown by trapping and telemetry was then mapped using ArcGIS software and hotspots of turtle activity were found within the ponds. Another implementation of spatial ecology worked to better understand the rate of nest predation at varying distances from the ponds, to find potential nesting sites and predators. By visualizing and understanding the patterns that emerge in analyzing the spatial ecology of painted turtles, conservation efforts can be concentrated on those areas most crucial to these creatures.

## Student Oral Presentations VI: PPHAC 335

2:35 - 3:30 PM

Moderator: Dr. Patrick van Esch

**Title:**                   **Presentation of Self on College Campuses: Is There a "Traditional" Gender Display Reward?**

Students:               Katie DeVito Erhart

Advisor:               Dr. Virginia Adams O'Connell

Location:               PPHAC 335

2:35 PM - 2:50 PM

Even in modern American society, individuals are instructed that there are expected ways to act and present that are appropriate for their assigned gender at birth. Women are taught to be charming, polished, and submissive. Men are socialized to be aggressive, dominant, tough. At the same time, we see a growing proportion of people, young and old, exploring non-binary identities, challenging these dichotomous categories in the media and in our communities. In this study, we explore students' self-perceived rewards for

*displaying “appropriate traditional” gender displays on a private liberal arts college campus in the Mid-Atlantic region using the analytical frameworks of Goffman, Cooley, and Zimmerman and West. We distributed a survey that collected information on both students’ perception of their own gender display as well as reports on how others describe them. We explore labels that remain highly gendered (“emotional” for women, “athletic” for men) and labels that appear in this setting gender-neutral (confident, friendly, motivated). We also explore the accumulated and differentiated impact of “gender-appropriate” display on students’ experiences at college with fellow students, faculty and staff.*

**Title:** **The Effects of Extracurricular Engagement on Self-Efficacy in Leadership Ability: A Study of Women in the Workplace**  
**Students:** Alyssa Torrisi  
**Advisor:** Dr. Patrick van Esch  
**Location:** PPHAC 335 2:55 PM - 3:10 PM

*This study investigates the effects of extracurricular (non-job related) engagement on self-efficacy in leadership ability of women in the workplace and provides evidence that the relationship between self-efficacy and extracurricular engagement is significant at the 0.001 level. Theoretical as well as managerial implications from this study will benefit both employees and employers of not-for-profit, for profit, and academic organizations. This study can be used as seminal work in the scholarly communities surrounding extracurricular engagement, self-efficacy, leadership ability, and women in the workplace.*

**Title:** **The Neuroprotective Potential of Curcumin in the 6-Hydroxydopamine Rat Model of Parkinson’s Disease**  
**Students:** Loukya Kanakamedala  
**Advisor:** Dr. Cecilia Fox  
**Location:** PPHAC 335 3:15 PM - 3:30 PM

*Parkinson’s disease is a progressive neurodegenerative disorder due to the loss of dopamine neurons within the nigrostriatal pathway. The destruction of these neurons through inflammation may be a result of enhanced glial cell responses. Curcumin, a compound derived from turmeric, has shown to not only provide protection to dopamine neurons, but also reduce the inflammatory response of glial cells. This study investigated the protective and restorative properties that may be provided by curcumin. It consisted of 4 groups: protective curcumin, protective control, restorative curcumin, and restorative control. The protective groups received respective drug injections prior to a 6-hydroxydopamine lesion while restorative groups received their injections post-surgical lesion. Each experimental animal received an injection (i.p.) of 75 mg/kg curcumin for 5 days/week while the controls received an equal volume of the vehicle, DMSO for 5 days/week . Behavior data using the rotarod, single-pellet reaching task, and foot-fault test were obtained. Improved motor function was observed in the curcumin treated groups when compared to the DMSO treated animals. Cellular data was obtained to observe dopamine neuron survival and activated microglia. Curcumin treated groups showed a greater percent dopamine survival, but a lower activation in microglia, when compared to the controls. The study indicates that curcumin is a novel protectant in parkinsonian rat models and this protection may be a result of its inhibition of glial cells.*

## Student Poster Presentations I: HUB Gallery

11:45 - 12:45 PM

**Title: Autonomous Weapon Systems: Is a Space Warfare Manual Required?**

Students: Magdalene Striluk

Advisor: Dr. Patrick van Esch

*The legalities for the use of Autonomous Weapon Systems (AWS) in space warfare are examined. Currently, there are manuals for air and missile warfare, naval warfare and cyber warfare, a clear gap in the literature is that there is no manual for space warfare. We find that the current legalities of space are somewhat considered analogous to the high seas and in the absence of a Space Warfare Manual, legal jurisdiction may consider that certain treaties are only in effect when in the territory of that State. In turn, the effectiveness of those treaties may mitigate against any obligations related to the military operations of that same State using AWS in space. Whilst it is yet to be tested in the courts, there are significant gaps identified in Lex lata and supporting Declarations, Principles and Treaties in terms of space warfare. Such gaps could act as the foundations for both law reform and the requirement for the development of a Space Warfare Manual.*

**Title: DNA Crosslinking by Rhodium Compounds**

Students: Swathi Kanakamedala

Advisor: Dr. Shari Dunham

*When it comes to pharmaceutical use, transition metal elements have been underexplored. One successful anticancer drug, cisplatin, has been used in the clinic to treat testicular cancer and has a platinum atom at its center. Cisplatin is capable of killing cancer cells because it is able to bind to and damage DNA, triggering apoptosis (programmed cell death). Dirhodium compounds affect DNA in a similar way by forming damaging cross-links on the duplex including interstrand cross-links. Our goal is to determine the percent of cross-links formed by each of the dirhodium compounds in a series. We will gather these data by performing denaturing agarose and polyacrylamide gels and then determine if there is a correlation between the composition and/or structure of the dirhodium compounds and the percent of interstrand cross-links that they form on DNA.*

**Title: College Student Future Work Stress Expectations: Does Maslow's Hierarchy Hold Up?**

Students: Katherine Corcoran, Breanna Deemer

Advisor: Dr. Robert Brill

*Students were invited to complete a short on-line survey about their levels of stress regarding their projected future work outcomes (i.e., seven years beyond graduation) that parallel Maslow's hierarchy of needs (e.g., pay, safety, social relations, achievement, and meaningfulness). For the most part, the aggregated profile of the 478 respondents aligned with the hierarchy, particularly in that lower basic needs were of greater concern to them (i.e., greater level of anticipated stress). One distinction was that safety defined as job stability had significantly higher concern than when it was defined as a safe working environment. Concerns about advancement and respect/recognition were also more pressing than social needs (e.g., good co-workers and enjoying the work context), which may be a clear, and perhaps healthy need shift in the workplace compared to Maslow's general need hierarchy. Moderating effects for gender, type of academic program, and college year were also explored; as were correlations with self reported GPA and prior work experience. Implications of the data for career planning and college student preparation are discussed.*

**Title: Satellite Cholera Outbreak Prediction and Household Willingness to Avoid Cholera**

Students: Lowell Perkins

Advisor: Dr. Sonia Aziz

*The poster displays a socioeconomic analysis of household reported willingness to pay for cholera vaccines in a district in Dhaka, Bangladesh. Much of the poster is a description of the econometric process involved with the analysis, as well as the conclusions that result. One of the main pieces of information displayed on the poster is how certain aspects of a household positively or negatively effect their willingness to pay for cholera vaccines.*

**Title: The Effects of Caffeine on Memory and Recall**

Students: Eric Morton

Advisor: Dr. Randolph Smith

*Twenty undergraduate participants from Moravian College, 10 men and 10 women, recalled a list of twenty-five words after consuming caffeine. After participants consumed caffeine, they completed mathematical problems and coloring sheets to allow the caffeine to take effect. Results indicated that caffeine enhanced the recall of words for participants in the experimental groups. A significant finding, ( $p < .01$ ) was that participants who consumed Espresso recalled more words than participants who consumed Red Bull as well as the control group.*

**Title: Extreme Kinesis: A Comparative Study of Prey Handling in Snakes**

Students: Ray Morales, Josh Levano

Advisor: Dr. Frances Irish

*The snake skull is kinetic, with upper jaws and snout movably suspended from the braincase, allowing snakes to swallow large prey whole. In this study, we analyzed rotation of the snout around a longitudinal axis through the nasofrontal joint (snout twisting) during swallowing. We recorded booid snakes during striking and swallowing using a high-speed video camera at 500 frames per second (fps) and a high-definition camera at 60 fps. The program Tracker was used to measure the angle of snout twisting. Results were analyzed using one-way analysis of variance (ANOVA) to test for significant differences in snout twisting between species. The data collected showed that all three species, *Boa constrictor*, *Candoia aspera*, and *Epicrates maurus* (mean angles 38°, 21°, and 9°, respectively) were significantly different in snout twisting ( $p = 0.001$ ). Further data is needed on snout mobility during swallowing in other booid species to answer the question of whether *Boa constrictor* has extreme snout mobility or if this ability is widespread among booid snakes. Mapping our data onto a recent phylogenetic tree suggests that the snout mobility seen in these species is an evolutionary innovation, but the question remains, what role does extreme kinesis play in snake evolution?*

**Title: Polyproline Folding: The Effect of Chain Length and Interactions**

Students: Amanda Miller

Advisor: Dr. Alison Holliday

*Proline is a unique amino acid because of its ability to take the form of both cis and trans conformations when it forms peptide bonds. It also folds at a rate that allows us to visualize its intermediates, unlike other proteins. Polyproline I (PPI) takes the form of cis and is soluble in organic solvents while polyproline II (PPII) takes the form of trans and is soluble in water. As a naturally occurring phenomenon known as protein folding, PPI changes to the more stable form of PPII when introduced to water. In order to observe the transition, polyproline is put into 1-propanol to preserve the PPI state. After some time, the liquid is completely evaporated to give solid PPI and 10/88/2 (1-propanol/H<sub>2</sub>O/acetic acid) is added to begin the folding into PPII. When looking to observe WW2's (a proline-binding, cell-signaling peptide) effects, ammonium acetate and the protein are incubated before adding the solution to dried polyproline. After the data is collected we account for electroosmotic flow by plotting electrophoretic mobility. This information is then overlayed in Excel to visualize differences between runs. We have determined there is a distinct difference between chain length and interactions.*

**Title: Color of Law: The Complexities of Power. A Case Study of Police Brutality Against African Americans.**

Students: Matthew Pring

Advisor: Angela Fraleigh

*This twofold study seeks to understand factors underlying police brutality against African-Americans. The first section encompasses research regarding police brutality against African-Americans. The other section comprises the artwork created by the author in response to the research. This latter section also includes an analysis of the formal elements and aesthetic quality of the artwork itself. The artwork includes seven large portraits and one large-scale police brutality scene. The study also features some recommended actions to address the issue, namely increased accountability, reduced militarization, and community policing to build bonds with civilians of color.*

**Title: Games Played on Paths**

Students: Devon Vukovich

Advisor: Dr. Nathan Shank

*This poster looks at problems that arise from the synthesis of Game Theory and Graph Theory. We analyze a partizan combinatorial game where one player moves by deleting a single vertex and the other player moves by deleting a single edge from a graph. We then establish variants of this game by altering the sets of graphs that are unplayable for each player. We are able to solve this game and its variants on several graph classes including paths, wheels, and complete graphs.*

**Title: Mapping a Novel Bang-Sensitive Gene in *Drosophila melanogaster***

Students: Gautam Kanakamedala

Advisor: Dr. Christopher Jones

*In *Drosophila melanogaster*, mutations in bang-sensitive genes result in muscle spasms and paralysis. The identification and further study of these genes contributes to our understanding of the mechanisms involved in seizures, both in flies and humans. Several of these genes have been identified and characterized while others were recently discovered; one such new gene is *sara3*. The location of *sara3* has not been identified, but previous work has localized it to a region containing six candidate genes. Seizures are the result of a series of neurological processes and in order to understand how *sara3* contributes to these processes, it is necessary that the gene be mapped. The experiments described here used genetic tools such as transposable elements, deletion mapping, and RNA interference to identify the location of the *sara3* gene.*

**Title: Modern Propaganda**

Students: Jenifer Hathaway

Advisor: Angela Fraleigh

*When does media become propaganda, and how do people respond? Analysis of propaganda and art reveals a subtle separation. To discover similarities and differences between propaganda of then and now, historical political posters are examined and compared to political rhetoric of today. The validity of the notion that history repeats itself is investigated in regards to the historical rise of fascism, with special attention paid to the anniversary of Kristallnacht on November 8th, International Holocaust Remembrance Day on January 27th, and modern events that have coincided with these dates.*

**Title:** Salt in Chips  
**Students:** Theresa Blumberg  
**Advisor:** Dr. Carl Salter

*During this experiment, I analyzed the difference of salt content in Herr's Salted Potato Chips and Good's Salted Potato Chips.*

**Title:** Do Adaptations for Burrowing Restrict Snout Mobility in Sand Boas?  
**Students:** Jon Raso, Amanda Hadeed  
**Advisor:** Dr. Frances Irish

*In snakes, the upper jaws and snout are movably attached to the braincase, allowing the jaws on each side of the head to move independently when swallowing. But for snakes that burrow, having a collapsible snout is problematic. Thus in many burrowing species, the nasofrontal joint between snout and braincase is widened to absorb the stresses of burrowing. We recorded snout movements in Sand Boas of the genus *Eryx*, a group of small, burrowing boas whose species are known to display a range of nasofrontal joint modifications. Do these morphological modifications, presumed to be adaptations for burrowing, restrict snout mobility during feeding in these snakes? Digital video recordings of eight *Eryx* species swallowing mice were used to measure angles of snout twisting during feeding. Here we report on *Eryx miliaris* and *E. muelleri*, combined with student data from previous studies of other *Eryx* species. One-way ANOVA reveals significant differences in mean snout twisting between *Eryx* species. *Eryx conicus*, with an unmodified nasofrontal joint, shows a mean snout twisting value nearly twice that seen in *Eryx johnii*, which has the most highly modified nasofrontal joint, suggesting that snout mobility is restricted in at least some *Eryx* species showing adaptations for burrowing.*

**Title:** Friendship, Victimization, and Peer-Interactions Among School Aged Children Home life and Mental Health  
**Students:** Emily Miller  
**Advisor:** Dr. Michelle Schmidt

*The current study explores how a child's home life, classroom behavior, and mental health can possibly impact how an individual may be victimized, be an aggressor or possibly be both. Specifically, we examined data from fourth graders in the Bethlehem Area School District as well as from their parents and teachers. Much of the children in this sample are considered "at risk" meaning most are minorities that live in low socioeconomic status, single parent households. The data came from various surveys, questionnaires as well as report cards. Findings indicate that there are indeed relationships between a child's home life, classroom conduct, their mental health and his or her social role (bully, victim, or bully-victim). Specific findings and implications will be discussed.*

**Title:** The Synthesis of Alanine-Substituted LamD Derivatives of *Lactobacillus plantarum*  
**Students:** Jonathan Le  
**Advisor:** Dr. Michael Bertucci

**Lactobacillus plantarum* is a gram-positive commensal bacterium in humans responsible for preventing the proliferation of many harmful bacteria responsible for the symptoms of Colitis and Irritable Bowel Syndrome (IBS). In order for gram-positive bacteria like *Lactobacillus* to achieve cell growth and biofilm formation, it must use a peptide called an autoinducing peptide (AIP) to communicate cell density. The purpose of this project was to create 6 different peptide derivatives of LamD in a technique called an alanine scan. This was achieved by synthesizing the AIP while replacing key amino acid residues with alanine. Linear peptides were synthesized residue by residue through solid phase peptide synthesis (SPPS). The resulting products were purified through high performance liquid chromatography (HPLC) and had their mass examined through a matrix assisted laser desorption/ionization time of flight (MALDI-TOF) machine. The final cyclized product was achieved through use of EDC, DIEA, HOBt, and DCM in an inert nitrogen environment. Currently, 2 of the 6 cyclized peptides have been fully created and purified, with purities of 95.1% for W5A and 97.1% for LamD. In addition, all linear peptides except for V2A have been fully synthesized with greater than 95% purity.*

**Title: Synthesis of Rhodium-DNA Model Complexes**

Students: Austin Mates

Advisor: Dr. Stephen Dunham

*Two dirhodium complexes were previously synthesized, cis-Rh<sub>2</sub>(OAc)<sub>2</sub>(OCOF<sub>3</sub>)<sub>2</sub> and trans-Rh<sub>2</sub>(OAc)<sub>2</sub>(OCOF<sub>3</sub>)<sub>2</sub>, these were studied for their ability to catalyze chemical transformations. This research primarily focuses on optimizing the procedure used to synthesize these dirhodium (Rh) complexes and to test their ability to bind to model DNA complexes. In order to confirm that these dirhodium complexes were synthesized in the reported percent yield various methods of analysis have been utilized including; nuclear magnetic radiation (NMR), high performance liquid chromatography (HPLC), and mass spectrometry (MS). Previous research has shown that cis-Rh<sub>2</sub>(OAc)<sub>2</sub>(OCOF<sub>3</sub>)<sub>2</sub> can bind with model DNA complexes, but the ability of trans- Rh<sub>2</sub>(OAc)<sub>2</sub>(OCOF<sub>3</sub>)<sub>2</sub> to bind DNA is largely unexplored.. The model DNA complex that will be used in these reactions is 9-ethylguanine, a model DNA base for deoxyguanosine. To study the result of this binding reaction we will isolate the Rh-DNA compounds by HPLC and study their structures via NMR and MS spectroscopies.*

## Student Poster Presentations II: PPHAC ATRIUM

4:00 - 5:00 PM

**Title: Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Model**

Students: Crystal Collins

Advisor: Dr. Kara Mosovsky

*Burkholderia pseudomallei is a facultative intracellular bacterial pathogen that causes the deadly disease melioidosis. Melioidosis is difficult to treat because B. pseudomallei is inherently antibiotic resistant. In previous studies, we found that a combination of ceftazidime and INF- $\gamma$  synergistically reduced the intracellular bacteria in macrophages infected with either B. pseudomallei or the related B. thailandensis. However, the remaining bacteria are antibiotic tolerant, which could still pose a threat to the host. Using pre-established methods to distinguish between antibiotic resistance and persistence, we have determined that the remaining bacteria are neither antibiotic resistant or persister cells, but are susceptible to the antibiotic. Further characterizing these sensitive cells, can potentially lead to future treatments against this fatal disease.*

**Title: Glycoalkaloids and False Potato Beetles**

Students: Meeghan Rossi

Advisor: Dr. Alison Holliday

*False Potato Beetles lay two different color eggs, and the darker ones are less eaten by predators. Glycoalkaloids are toxic chemical compounds to mammals. They are found in certain solanaceous plants, which is what the False Potato Beetle eats. If glycoalkaloids are found in the darker eggs, it could explain why they are not eaten by predators. This study analyzes the eggs to see if any glycoalkaloids can be found in them. After optimization of the method, I extracted the eggs using maceration in ethyl acetate. Analysis was done using High Performance Liquid Chromatography (HPLC). After separation, glycoalkaloid standards can be detected using UV/Vis.*

**Title: Establishing Preliminary Relationships Between Peptide Structure and Quorum Sensing Activity in Bacillus Cereus**

Students: Jessica Lynch

Advisor: Dr. Michael Bertucci

*This project focuses on bacterial quorum sensing and its role in bacterial virulence. Bacteria communicate with each other using chemical signals, or autoinducers, resulting in synchronized group behavior. When the density of autoinducers (and therefore bacterial cells) is high, they bind to a receptor in the cells and spark synchronized behavior. If this communication pathway could be interrupted, it could prevent synchronized behaviors such as biofilm production or virulence. Our project's goal is to modify the autoinducer in Bacillus cereus to interfere with the communication circuit so that biofilm production cannot occur. The autoinducer responsible for quorum sensing in B.cereus is a peptide containing seven amino acids. An alanine scan was performed to provide insight into which amino acids are most critical for initiating quorum sensing. Several synthesized peptide derivatives were then biologically tested on genetically modified strains of Bacillus thuringensis. A beta-galactosidase assay was used to determine which peptide derivatives have an effect on the quorum sensing mechanism.*

**Title: Utilizing Faculty Interviews as an Epistemological Tool Throughout a Modified Writing-Enriched Curriculum Process at a Small Liberal Arts College**

Students: Chris Hassay

Advisor: Dr. Crystal Fodrey

*As I continue to collaborate with a professor on instituting a Writing-Enriched Curriculum (WEC) within our local context at a small liberal arts college (SLAC), the use of interviews as a supplemental font of qualitative information has provided a more fully developed understanding of the academic environment of a department. First developed by Pamela Flash at the University of Minnesota, WEC is designed to thoughtfully integrate writing in departments utilizing the components and elements of composition which are deemed most pertinent by the faculty within the targeted department. As Flash explains on the WEC website, "WEC provides academic departments with a way to ensure that discipline-relevant writing and writing instruction are intentionally infused into their undergraduate curricula." At our SLAC, where departments are oftentimes under 10 full-time faculty members, interviews serve as an addition to Flash's model that can fit reasonably within our WEC timeline. At the Undergraduate Poster session I hope to present the process which we believe is optimal for SLAC schools and contribute to the conversation on WEC which is increasingly being modified and replicated at SLACs across the country—Hobart and William Smith, Grinnell, Colby, Stetson and possibly others have WEC programs under development.*

**Title: A Proposed Metacognitive Tutoring Program Between Individuals with Autism Spectrum Disorder**

Students: Kristin Shean

Advisor: Dr. Sarah Johnson, Dr. Robert Brill

*This paper proposes a metacognitive tutoring program between students with autism spectrum disorder (ASD). Outlined is the executive dysfunction that occurs in individuals with ASD as they try to process information, particularly as it pertains to organization, planning, and time management. The program itself is broken up in to three one hour-long sessions weekly for nine weeks. The topics cover how to access knowledge the ASD student should have already gained. This is done by using tools such as scheduling, goal setting, and time management. Also developed was a tutor training program, adapted to address difficulties that those individuals with ASD may face when working closely with other students. In addition, also discussed is a parent attitude survey that was give to assess the feasibility of the program, were it to be used in a practical application.*

**Title: Are We Truly the Land of the Free? Mass Incarceration, Prison Reform, and the MacArthur Foundation**

Students: Nina DePalma

Advisor: Dr. Virginia Adams O'Connell

*The United States has the highest incarceration rate of any developed nation in the world. With over 2 million people in prisons and jails, it is becoming an issue of attraction for activists, humanitarians and politicians alike. The United States has developed a prison-industrial complex, which is explored by using sociologist Charles Wright Mills's theory of the Power Elite. Looking to alleviate the condition of the criminal justice system, in this case specifically in Philadelphia, the MacArthur Foundation has given 3.5 million dollars to the city. This money aims to reduce the incarcerated population by 34% as well as address racial and ethnic disparities. This paper uses a journalistic approach to explore connections between the power elite, prison industrial complex, the issue of mass incarceration and the MacArthur Grant in Philadelphia.*

**Title: College Athletes: A Nursing Perspective on Challenges and Outcomes in Athletes with Eating Disorders**

Students: Meg Brockett

Advisor: Dr. Pamela Adamshick

*The purpose of this study was to determine the prevalence of eating disorder behaviors and symptoms reported in the student athlete population on selected teams at Moravian College and to examine associations of disordered eating with gender, self-esteem, struggles in life, and use of supports. A descriptive design with a researcher-constructed survey was used. Findings show that males are equally susceptible to eating disorders as females. The number of symptoms or behaviors negatively correlates with self-esteem, and positively correlates with struggles in life, diversity of support systems and use of professional help. Nursing implications are identified to improve education, provide information, and implement treatment to better serve all college athletes.*

**Title: Reaction Rates of Novel Rhodium Compounds with Duplex DNA**

Students: Ana Bustamante

Advisor: Dr. Shari Dunham

*Rhodium compounds have been explored as potential antitumor drugs due to their ability to bind to double stranded DNA (ds-DNA). This research will determine how much rhodium binds to ds-DNA by measuring its binding rate over time. Two different rhodium compounds (Rh 0:4 and Rh 3:1) were reacted with salmon testes DNA and analyzed for DNA binding over a week. Time points were taken during that week and processed to remove unbound rhodium. The concentration of isolated DNA was then determined by molecular absorption spectroscopy using a new NanoDrop One spectrometer. The amount of bound rhodium was determined by atomic absorption spectroscopy. Best practices for use of the NanoDrop One for DNA quantitation were determined and will be summarized. Plots of DNA-bound rhodium vs. time will be presented and rates of DNA binding will be compared across several different rhodium compounds.*

**Title: Quantification of Misaligned Carapace Scutes in the Painted Turtle, *Chrysemys picta***

Students: Robert McKinley

Advisor: Dr. Frank Kuserk

*The painted turtle, *Chrysemys picta*, has four different subspecies called the eastern, western, southern and midland subspecies. Due to the Wisconsin glaciation, the genus *Chrysemys* was distributed across North America forming different subspecies of the species, *C. picta*. Extensive research has been done since the early 20th century, regarding the differences in the physical characteristics between the subspecies as well as the certain boundaries their subspecies reside within North America. With the help an equation used by Hartman (1958), as well as an image analysis software called Image J, revealed that the degree of misalignment in carapace scutes, a physical characteristic used to distinguish between the subspecies, correlates to an eastern painted turtle. However, further data analysis revealed that study site could be a zone of intergradation due to the obvious presence of the midland subspecies.*

**Title: Art and the Sublime**

Students: Gina M Piazza

Advisor: Angela Fraleigh

*In aesthetics, the sublime (from the Latin sublimis (under the lintel, high, exalted)) is referred to the quality of transcendent greatness. This greatness or awe comes from either a physical, moral, intellectual, metaphysical or artistic point of view. My Thesis is based upon how the Sublime is depicted in art as well as the historical context on the notion of the Sublime. My of the theory of the sublime is explored within my use of oil mediums depicting how the sublime can be found in everyday moments.*

**Title: The Importance of Zoos in Wildlife Conservation**

Students: Jackie Finnegan

Advisor: Dr. Frank Kuserk

*The purpose of zoos is to inform and educate the public that endangered species need our help. By connecting people to these animals, they are more likely to be motivated to get involved and try to save endangered species while we still can. Throughout my internship at Lehigh Valley Zoo, I have learned about everything that goes on behind the scenes in terms of animal care, public education about wildlife, and programs put in place to ensure the survival of species. The Species Survival Plan (SSP) was created by the Association of Zoos and Aquariums (AZA). Its purpose is to oversee the population management of select species and enhance conservation of these species in the wild. These plans include matching animals from various zoos to be mated to prevent interbreeding and ensure that healthy familial lines are being passed down. SSPs also oversee reintroduction programs. The Scimitar oryx is an endangered and almost extinct species in the wild. Through these programs oryx are being bred and released into designated parts of Chad, Africa to see if reintroduction into the wild is possible. With the help of SSPs we can increase populations of endangered species and decrease the rising number of extinctions.*

**Title: Alleviating Seizures Using Various Compounds with D. melanogaster**

Students: Kayli Silimperi

Advisor: Dr. Christopher Jones

*Drosophila melanogaster is commonly used as a model organism in human genetic studies. Treating human seizure conditions is often difficult due to our incomplete knowledge surrounding the cause of various seizures. Drosophila contains various bang-sensitive (BS) mutations which can mimic the seizures seen in humans. This means Drosophila could potentially act as a model organism for different seizure alleviating compounds, such as phenytoin, nicotine, and CBD. Phenytoin has been used in previous studies to ameliorate seizure symptoms in eas BS Drosophila. Nicotine has previously been used in mammal models to reduce seizure symptoms, but not with Drosophila as it is an insecticide. The work combining nicotine and Drosophila has been confined to simply exposing flies to the drug; nothing has been done to evaluate its possible therapeutic benefits. CBD has also been used in mammal models, but never with Drosophila. There was no real issue of lethality, so potential therapeutic benefits can be more readily studied. This study observed the general effects phenytoin, nicotine, and CBD have on eas, bas, and wild type Drosophila. This will help determine whether or not Drosophila can act as an appropriate model organism for analyzing these compounds' effects on seizures.*

**Title: The Dilemma of Divine Foreknowledge and Human Freedom**

Students: Nathan Nocchi

Advisor: Dr. Arash Naraghi

*The Divine Foreknowledge Dilemma is one of the most vexatious problems in the history of philosophy of religion. The dilemma arises from two contentions that the Classical theist strives to maintain, (1) God is a being whose greatness exceeds all other beings, He is a maximally great being. God is ascribed the property of omniscience and He, who is a maximally great being, is taken to know all things infallibly.*

(2) At some instances throughout the history an agent S, S was free with respect to action Y in that it was in the power of S to choose from S's selective realm, Y and non-Y. (Traditional conception of freewill)

Many Classical theists insist upon these two metaphysical contentions for various reasons, such as upholding the majesty of God, or making sense of Divine injunctions warranting punishment. However, maintaining these two contentions seems to bring about an inconsistent state of affairs. Namely that,

(1) God is essentially omniscient and essentially infallible.

(2) God's infallible believing the proposition at t1 that S will do Y at t2.

(3) It being within the power of S to refrain from doing Y at t2.

Given this collection, S's ability to do otherwise is removed by the force of God's foreknowing at a preceding time what act S would bring about subsequent to God's initial knowing. I propose that the type of freedom and moral responsibility humans possess do not require the ability to do otherwise. Rather, it requires that we have a particular type of control over our actions. If an agent has this control over their acts, even in the fact of God's foreknowing that act, the agent may be rendered both free and morally responsible.

**Title: MALDI Mass Spectrometry Characterization of Rhodium DNA Adducts**

Students: Leanna Talotta-Altenburg

Advisor: Dr. Stephen Dunham

*Metallic based antineoplastic agents have been extensively researched and improved upon in the 20th century. One successfully formulated drug is platinum based and manufactured as the generic form cisplatin. The biochemical activities of other transition metals, including rhodium, continue to be investigated. While transition metals, and their cytotoxic effects, are efficacious in targeting tumors in both animal and human models, their mechanism of action is not fully understood. However, it has been determined in recent years of experimentation that platinum interferes with DNA replication by binding irreversibly to the nitrogenous base guanine. Once replication is disrupted, cancer cells cannot proliferate. Rhodium is a transition metal in the family that includes platinum and shares its properties. MALDI (Matrix Assisted Laser Desorption/Ionization) mass spectrum analysis is an assay used to characterize fragmentation of proteins and other biomolecules based on size. Analysis of a series of DNA rhodium complexes will aid us in determining what base pair rhodium is bound to in a purified, double stranded oligomer. It is through this series of assays, data collection and interpretation that we hope to achieve a greater understanding of rhodium and its mechanism of action in cancer cell DNA.*

**Title: Recapitulating Immuno-Antimicrobial Synergy against Escherichia coli infections**

Students: Paige Hart

Advisor: Dr. Kara Mosovsky

*Burkholderia pseudomallei is an intrinsically antibiotic resistant gram-negative bacterium that is the causative agent of the fatal disease melioidosis. Research has elucidated that macrophages treated with a combination of the antibiotic, ceftazidime, and the cytokine, interferon-gamma, experience synergistic killing of Burkholderia pseudomallei. We utilized the model organism Escherichia coli to infect murine macrophages in order to discern if synergistic killing occurs when a different species of intracellular bacteria is treated with an antibiotic and immune stimulant combination therapy. An initial titration of both ceftazidime and interferon-gamma was completed to determine the optimal concentrations of both agents to ensure maximum killing individually. By exposing E. coli infected macrophages to a combination of ceftazidime and interferon-gamma, we attempted to determine if immuno-antimicrobial synergy occurs in bacteria other than B. pseudomallei. If this phenomenon occurs in E. coli, it is possible that this treatment will work similarly for other infections caused by prevalent intracellular pathogens and thus result in a paradigm shift in how we treat them.*

**Title: Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Model**

Students: Crystal Collins

Advisor: Dr. Kara Mosovsky

*Burkholderia pseudomallei* is a facultative intracellular bacterial pathogen that causes the deadly disease melioidosis. Melioidosis is difficult to treat because *B. pseudomallei* is inherently antibiotic resistant. In previous studies, we found that a combination of ceftazidime and  $INF-\gamma$  synergistically reduced the intracellular bacteria in macrophages infected with either *B. pseudomallei* or the related *B. thailandensis*. However, the remaining bacteria are antibiotic tolerant, which could still pose a threat to the host. Using pre-established methods to distinguish between antibiotic resistance and persistence, we have determined that the remaining bacteria are neither antibiotic resistant or persisters cells, but are susceptible to the antibiotic. Further characterizing these cells, can potentially lead to future treatments against this fatal disease.

## ***Moravian College Honors Students 2016-2017***

Sarah Atwood, Female Sexuality in American Art between WWI and WWII, Art History. Advisor: Martha Kearns

Megan Brockett, Participation in Collegiate Athletics: A Nursing Perspective on Challenges and Outcomes with Athletes with Eating Disorders, Nursing. Advisor: Pamela Adamshick

Stephanie Canete, Predictors of Abstinence Among College Students, Sociology. Advisor: Debra Wetcher-Hendricks

Nina DePalma, Reforming Philadelphia's Broken Prison System, the Mac Arthur Foundation, Sociology. Advisor: Virginia Adams O'Connell

Ryan Dibilio, Comparisons of Early and Late War Volunteers in the American Civil War, History. Advisor: Jamie Paxton

Shelby Does, Turtle Nest Predation and Inter-pond Migration at Three Ponds at the Lehigh Gap Nature Center, Environmental Science. Advisor: Frank Kuserk

Ryan Frace, Is There a Need for the 'War on Drugs'? The Social Effects of Rhetoric and Policy, Sociology. Advisor: Daniel Jasper

Matthew Hosty, Social Outcomes and Inequality: Optimal Levels of Inequality, Economics. Advisor: Eva Marikova Leeds

Gunnar Houseknecht, Incidence of Burnout Syndrome in Moravian College Nursing Students, Nursing. Advisor: Janice Farber, Robbi Alexander

Gautam Kanakamedala, Isolating Resulting Protein from Bang-sensitive Genes and Identifying Protein Antibodies, Genetics/Biochemistry. Advisor: Christopher Jones

Loukya Kanakamedala, The Neuroprotective Potential of Curcumin in the 6-Hydroxydopamine Model of Parkinson's Disease: A Cellular Study, Neuroscience. Advisor: Cecilia Fox

Swathi Kanakamedala, Crosslinking of Duplex DNA by Different Rhodium Compounds, Biochemistry. Advisor: Shari Dunham

Rowan Laitila, Women in Art, Art History. Advisor: Diane Radycki

Jonathan Le, Observing the Effect of Stereochemical Relationships in the Autoinducing Peptide for Quorum Sensing in *Bacillus cereus*, Chemistry. Advisor: Michael Bertucci

Christina Marinaro, Mapping the *bas* Gene in *Drosophila melanogaster*, Biology. Advisor: Christopher Jones

Gabrielle Marotta, Controversies of Legal Policies in Spain Proceeding the Reign of Ferdinand and Isabella (1492-1700), Spanish. Advisor: Claudia Mesa

Robert McKinley, Quantitative Analysis of Shell Markings in Two Subspecies of the Painted Turtle, *Chrysemys picta*, Biology. Advisor: Frank Kuserk

Nathan Nocchi, Divine Foreknowledge and Human Freedom, Philosophy. Advisor: Arash Naraghi

Patrick Oswald, The Composition of a Set of Madrigals and Analysis of Madrigal Examples from the Late Renaissance, Music Composition. Advisor: Larry Lipkis

Lowell Perkins, Advanced Cholera Prevention in Bangladesh - Satellite Predictions and Localized Treatment, Economics. Advisor: Sonia Aziz

Matthew Pring, Color of Law: The Complexities of Power, Studio Art. Advisor: Angela Fraleigh

Kristin Shean, Holding themselves accountable: The effects of peer tutoring on children with autism spectrum disorder, Psychology. Advisor: Robert Brill, Sarah Johnson

Kayli Silimperi, Investigation of Anti-Seizure Compounds in Fruit Flies, Biochemistry. Advisor: Christopher Jones

Jordan Sweeney, The Role of Physical Activity in the Overall College Experience: How Students and Athletic Directors Perceive the Challenges and Benefits of Staying Physically Active in College, Sociology. Advisor: Virginia Adams O'Connell

Alyssa Torrisi, An Exploration of Motivators That Impact Performance Factors, Business Management. Advisor: Katie Desiderio, Patrick van Esch

Devon Vukovich, Edge and Vertex Connectivity Games, Mathematics. Advisor: Nathan Shank

Jennifer Francesco, Identification of Novel Genes in Bang-Sensitive Mutants through Mutagenesis, Biology. Advisor: Christopher Jones

## ***SOAR Grant Recipients 2016-2017***

### **2016 SOAR Summer Research Grant Recipients**

India's Black Economy: Origins, Obstacles, and Opportunities. Co-sponsored by the Center for Intercultural Advancement and Global Inclusion  
Vishu Solanki & Dr. James West

The Delaware River Watershed Initiative: Macroinvertebrate and Fish Community Assessment in the Upper Lehigh River Watershed  
Richard Buffone, Josh Toth, & Dr. Frank Kuserk

Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Model  
Crystal Collins & Dr. Kara Mosovsky

Effect of a Temperature-sensitive Mutation on Bang-sensitive Mutants in *Drosophila melanogaster*  
Brandon Dimick & Dr. Christopher Jones

Turtle Population Dynamics in Three Ponds at the Lehigh Gap Nature Center  
Shelby Does, Rob McKinley, & Dr. Frank Kuserk

Recapitulating Immuno-Antimicrobial Synergy against *Escherichia coli* Infections  
Paige Hart & Dr. Kara Mosovsky

An Algebraic Investigation of Constrained and Bandaged Rubik's Cubes  
Bryan Harvey & Dr. Kevin Hartshorn

Laying the Groundwork for a Writing-Enriched Curriculum at Moravian College  
Christopher Hassay & Dr. Crystal Fodrey

Intergenic Effects of Bang-sensitive Mutations in *Drosophila melanogaster*  
Gautum Kanakamedala & Dr. Christopher Jones

The Neuroprotective Potential of Curcumin in the 6-Hydroxydopamine Model of Parkinson's Disease  
Loukya Kanakamedala & Dr. Cecilia Fox

DNA Cross-linking by Antitumor Active Rhodium Compounds  
Swathi Kanakamedala & Dr. Shari Dunham

Establishing Preliminary Relationships between Peptide Structure and Quorum Sensing Activity in *Bacillus cereus*  
Jessica Lynch & Dr. Michael Bertucci

Synthesis of Rhodium-DNA Model Complexes  
Austin Mates & Dr. Stephen Dunham

Polyproline Folding: Effect of Chain Lengths and Interactions  
Amanda Miller & Dr. Alison Holliday

Friendship, Victimization, and Peer Interactions in School-aged Children  
Emily Miller & Dr. Michelle Schmidt

Extreme Kinesis: A Comparative Study of Prey Handling in Snakes  
Raymond Morales, Josh Levano, & Dr. Frances Irish

Free Will in Light of Contemporary Neuroscience  
Nathan Nocchi & Dr. Arash Naraghi

Moravian Music: Creating Performance Editions for Anthems and Choral Works  
Matthew Obszarny & Dr. Hilde Binford, with the assistance of Gwyneth A. Michel, Assistant Director, Moravian Music Foundation

How Do Sand Boas Capture Prey They Can't See?  
Michelle Pomposello & Dr. Frances Irish

Optimizing Extraction and Analysis using Liquid Chromatography  
Meeghan Rossi & Dr. Alison Holliday

Effect of Bang-sensitive Mutations on Memory in *Drosophila melanogaster*  
Kayli Silimperi & Dr. Christopher Jones

The Role of Physical Activity in the Overall College Experience: How Students and Athletic Directors Perceive the Challenges and Benefits of Staying Physically Active while in College  
Jordan Sweeney & Dr. Virginia Adams O'Connell

Manipulating Signal Hydrophobicity to Alter Quorum Sensing in *Streptococcus pneumoniae*  
Erin Tiwold & Dr. Michael Bertucci

Edge and Vertex Failure Games on Graphs  
Devon Vukovitch & Dr. Nathan Shank

Stereotype Analysis of Alternative Medicine Practices  
Micaela Wilson & Dr. Sarah Johnson

#### **2017 SOAR Winter Semester Research Grant Recipients**

Mass Spectrometry Characterization of Rhodium-DNA Adducts  
Leanna Talotta & Dr. Stephen Dunham

Characterizing Rhodium-DNA Model Complexes  
Austin Mates & Dr. Stephen Dunham

## ***Student Conference Presentations 2016-2017***

**National Conference on Undergraduate Research**, University of Memphis, April 2017

Megan Brockett

Participation in Collegiate Athletics: A Nursing Perspective on Challenges and Outcomes with Athletes with Eating Disorders

Faculty Mentor: Dr. Pamela Adamshick

Shelby Does

Understanding and Visualizing the Spatial Ecology of Painted Turtle Populations in Eastern Pennsylvania

Faculty Mentor: Dr. Frank T. Kuserk,

Matthew Hosty

Causes and Consequences of Inequality

Faculty Mentor: Dr. Eva Leeds

Gautam Kanakamedala

Mapping a Novel Bang-Sensitive Gene,

Faculty Mentor: Dr. Christopher Jones

Loukya Kanakamedala

The Neuroprotective Potential of Curcumin in the 6-Hydroxydopamine Model of Parkinson's disease

Faculty Mentor: Dr. Cecilia Fox

Swathi Kanakamedala

Percent Crosslinking of Duplex DNA by Different Rhodium Compounds

Faculty Mentor: Dr. Shari U. Dunham,

Josh Levano & Raymond J. Morales

Extreme Kinesis: A Comparative Study of Prey Handling in Snakes

Faculty Mentor: Dr. Francis Irish

Maria Lusso

How do parent and peer relations impact attitudes towards heroin use?

Faculty Mentor: Dr. Stacey Zaremba

Amanda Miller

Polyproline Folding: Effect of Chain Length and Interactions

Faculty Mentor: Dr. Alison Holliday

Emily Miller

Friendship, Victimization, and Peer-Interactions Among School Aged Children Home life and Mental Health

Faculty Mentor: Dr. Michelle Schmidt

Michelle Pomposello

How Do Sand Boas Capture Prey They Cannot See?

Faculty Mentor: Dr. Frances Irish

**Landmark Conference 8th Annual Summer Research Symposium, Moravian College, July, 2016**

Oral Sessions

Catalytic Properties of Novel Dirhodium Compounds

Student: Ian Painton

Synthesis of Rhodium-DNA Model Complexes

Student: Austin Mates

Moravian Music: Creating Performance Editions for Anthems and Choral Works

Student: Matthew Obszarny

Friendship, Victimization, and Peer Interactions Among School Aged Children

Student: Emily Miller

Pesticide monitoring of local watersheds

Student: Matthew Little

Manipulating Signal Hydrophobicity to Alter Quorum Sensing in *Streptococcus pneumoniae*

Student: Erin Tiwold

The Role of Scale in Ecological Studies: Benthic Macroinvertebrate Community Structure

Student: Richard Buffone Joshua Toth

Turtle Population Dynamics in Three Ponds at the Lehigh Gap Nature Center

Student: Rob McKinley, Shelby Does

An Algebraic Investigation of Restricted Movement Rubik's Cubes

Student: Bryan Harvey

DNA Cross-linking by Antitumor Active Rhodium Compounds

Student: Swathi Kanakamedala

How Do Sand Boas Capture Prey They Cannot See?

Student: Michelle Pomposello

Effect of Bang-sensitive Mutations on Memory in *Drosophila melanogaster*

Student: Kayli Silimperi

Poster Session

Establishing preliminary relationships between peptide structure and quorum sensing activity in *Bacillus cereus*

Student: Jessica Lynch

Polyproline Folding: Effect of Chain Length and Interactions

Student: Amanda Miller

Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Model

Student: Crystal Collins

Intergenic effects of bang-sensitive mutations in *Drosophila melanogaster*

Student: Gautam Kanakamedala

Extreme kinesis: a comparative study of prey handling in snakes

Student: Raymond Morales

The Neuroprotective Potential of Curcumin in the 6-Hydroxydopamine Model of Parkinson's Disease

Student: Loukya Kanakamedala

Glycoalkaloids & False Potato Beetle Eggs

Student: Meeghan Rossi

Recapitulating Immune-Antimicrobial Synergy Against *Escherichia coli* Infections

Student: Paige Hart

**31<sup>st</sup> Annual Student Mathematics Conference** sponsored by Moravian's chapter of Pi Mu Epsilon and LVAIC, Moravian College, February 2017.

Steven Berger, The Harmonious Sounds of Mathematics

Brittany Costa, The Mathematics Behind CPR

Devon Vukovich, Deletion Games Played on Paths (also presented at DeSales University Discrete Math Days)

Shane Hansen, The Development of 0 Through 9

**LVAIC Women's and Gender Studies Conference** presenters:

Kate Arner

Kayleigh Bennett

Alexa Canella

Devyn Lapp

Toshi Figueroa

**Women's History Month.** Students presented on topics such as Women, Gender and Body Image; Rape Culture, Title IX, Women in STEM Fields, and Depictions of Women in Video Games; Women in Saudi Arabia; and Trans-Inclusive Gender Equality. Student presenters:

Alyssa Flannery

Brianna Suvire

Rathath Alawad

Kheloud Alenezi

Hadeel Raboui

Vaughn Tempesta

Miles Molerio

James Jarvis

Emma Adam

Kate Arner

Kayleigh Bennett

Alexa Canella

Devyn Lapp

Toshi Figueroa

Holly Hinkle, Eric Yeakel, Shane Hansen, and Joseph Fabian, "Was World War II a 'Just War'? Japan and Nuclear Weapons," Christian Ethics and War Panel Presentation at the **LVAIC Undergraduate Conference on "From War to Peace: Drawing on the Arts to Build a More Just Society in the Lehigh Valley."** Faculty Moderator: Dr. Kelly Denton-Borhaug

Francesca Caruso, "Reaktionen auf Prostitution in der Weimarer Republik," presented at the seventh annual **Undergraduate Research Conference in German Studies**.

Devon Vukovich, "Partially Ordered Group of Games," poster presented at **Underrepresented Students in Topology and Algebra Research Symposium**, Amherst College. Faculty Advisor: Dr. Nathan Shank.

Bryan Harvey, "An Algebraic Investigation of Conditionally Restricted Rubik's Cubes," talk presented at **DeSales University Discrete Math Days**.

*The End of the World as We Know It?* **2017 Annual Meeting of the Eastern Sociological Society**, Philadelphia, February 23-26, 2017:

Paper Session: Inside the Black Box of College I: On-campus Experiences

The Role of Physical Activity in the Overall College Experience: How students and athletic directors perceive the challenges and benefits of staying physically active while in college. Virginia Adams O'Connell — Moravian College, Jordan Sweeney — Moravian College

Paper Session: Education, College, and Gender

Presentation of Self on College Campuses: Is there a "traditional" gender display reward? Virginia Adams O'Connell — Moravian College, Katie DeVito Erhart — Moravian College

Poster

The War on Drugs: A Sociological Perspective, Ryan Nicholas Frace — Moravian College. Advisor: Dr. Daniel Jasper.

Emily Smith, "Tree-Ring Dating from the Sixth Oldest College in the Nation," poster to be presented at the **Mid-Atlantic Ecological Society of America meeting**, Stockton College.

Chris Hassay, "Utilizing Faculty Interviews as an Epistemological Tool throughout a Modified Writing-Enriched Curriculum Process at a Small Liberal Arts College" poster presented during an undergraduate research poster session at the **Conference on College Composition and Communication** in Portland, Oregon, March 2017.

Crystal Collins, "Antibiotic Tolerance: Distinguishing between Classical Resistance and Persistence in a Macrophage Infection Mode," presented at the regional conference for Tri-Beta Honors Society and the Pennsylvania Academy of Science. Faculty Advisor: Kara Mosovsky

Eleventh **Moravian College Undergraduate Conference in Medieval and Early Modern Studies**, December 2016. Featured paper presentations by 81 students from 29 schools. Five papers were presented by Moravian undergraduates, and a further 19 students, alums, faculty, staff, and emeriti chaired panels and moderated discussions.

Skylar Eidem, "From Wealhtheow to Guinivere: The Loss of Agency in Queenship from the Anglo-Saxon to the Later Medieval Period"

Emily Houser, "'The Husband's Message' and 'The Wife's Lament': A Comparison"

Max Kraft, "Heroes, Saints, and Soldiers of God: The Christianization of the Anglo-Saxon Hero Figure"

Richard Roman, "*Beowulf* and the Imagination"

Bridget Seche, "Beowulf and St. Brendan as Warrior Figures"

## ***The Art Department***

### **Senior Thesis Exhibition**

**Opening Reception: Thursday, April 20, 6:30 to 8:00 p.m.**

**Show runs through graduation**

**Closing Reception: Saturday, May 13, 2:00 to 4:00 p.m.**

The Senior Thesis Show represents the thesis work of our graduating seniors done in their capstone courses in studio art, graphic design, art education, art history, and photography/media.

Students represented in the Senior Show:

Sarah Atwood, Art History

Emily Benonis, Studio/Photography

Andrew Bentzoni, Art History

Dominic Bertrand, Graphic & Interactive Design

Marquise Bourgeois, Studio Art

Nicholas Capraro, Art History

Jessica Donovan, Graphic & Interactive Design

Caroline Dooley, Art History

Angela Emili, Art Education

Brandon Ewer, Graphic & Interactive Design

Jenifer Hathaway, Studio Art

Sarah Krasinski, Graphic & Interactive Design

Rowan Laitila, Art History

Tracy Lakrham, Graphic & Interactive Design

Renee Liedig, Art Education

Shayna O'Boyle, Graphic & Interactive Design

Marisa Pacitti, Graphic & Interactive Design

Gina Piazza, Studio Art

Matthew Pring, Studio Art

Casey Raymond, Art History

Elias Saba, Graphic & Interactive Design

Sabrina Signorelli, Graphic & Interactive Design

Hannah Smolko, Graphic & Interactive Design

Michael Valentine, Graphic & Interactive Design

Melissa Walko, Art Education

## ***Theatre***

"STUFF" April 6-9, 2017

A student-devised, faculty-directed play about UN-sustainability that was created to support the college's year-long IN-Focus theme of sustainability.

In Theatre devising, there is no script going into the rehearsal process. The piece is developed by the actor-creators involved. In "STUFF," the text and format of the show grew out of improvisational exploration that happened during rehearsals.

Many students contributed in various ways throughout the process of creating the piece, but a core group of five performers did most of the devising work themselves:

Corinne Philbin  
Alex Pena  
Dalton Hornberger  
Kayli Silimperi  
Kayleigh Ficarra

They were supported by Assistant director: Makenna Masenheimer, Stage manager: Melissa Gustafson

The faculty director was Christopher Shorr.

*There were also several student-directed projects included in Moravian's 2016-17 theatre season:*

- A staged reading of Oscar Wilde's "An Ideal Husband" Directed by Kayli Silimperi in September 2016
- A full production of Peter Gordon's "Murdered to Death" Directed by Leah Matusewicz in November 2016.
- A staged reading of Woody Allen's "God" Directed by Alex Poncelet in January 2017
- A full production of Marc Camoletti's "Boeing-Boeing" Directed by Kayli Silimperi in February 2017
- A staged reading of John Patrick Shanley's "Doubt: a parable" Directed by Leanna Altenburg in April 2017