

MORAVIAN UNIVERSITY

The 17th Annual Student Scholarship and Creative Endeavors Day

April 19, 2022

This year, 87 students, representing 15 different areas of study, are participating in the 2022 Scholars Day activities. Congratulations to these student scholars for all of their accomplishments, and many thanks to their 23 faculty sponsors. Since the inception of this event 16 years ago, 1121 students have shared their scholarly accomplishments with the Moravian University community.

**The 17th Annual Moravian University
Undergraduate Student Scholarship and Creative
Endeavors Day
April 19, 2022**

**MORAVIAN
UNIVERSITY**

Schedule of Events

- 11:00 a.m. **Welcome and Opening Remarks**
Hauptert Union Building, UBC Room
- 11:00 a.m. – 11:55 a.m. **Session I: Oral Presentations**
Hauptert Union Building, UBC Room
- 12:00 p.m. – 1:00 p.m. **Student Poster Presentations I**
Hauptert Union Building, Gallery Walls
- 12:55 p.m. – 1:45 p.m. **Session II: Oral Presentations**
Hauptert Union Building, UBC Room
- 2:00 p.m. – 2:55 p.m. **Session III: Oral Presentations**
Hauptert Union Building, UBC Room
- 3:35 p.m. – 4:10 p.m. **Session III: Oral Presentations**
Hauptert Union Building, Amrhein Room
- 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 17th Annual Moravian University Undergraduate Student Scholarship and Creative Endeavors Day would not have been possible without the commitment of many people at Moravian University.

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 University Honors Program

HUB Management Staff

Food Services, Facilities Management, and the Registrar's Office

The Mathematics Program

Jennifer McKinley, Secretary for the Psychology Department

The 17th Annual Moravian University Undergraduate Student Scholarship and Creative Endeavors Day

Program Overview

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

11:00 AM: Opening Remarks – HUB, UBC Room

SESSION I

Oral Presentations Session I: Moderator - Dr. Shank HUB UBC Room			
11:00 AM	Kaleigh Weber, Rachel Kelly, Jessica Mann, Samantha Silliman <i>Investigating the Acoustic Variability in the Production of /a/ Between Native and Non-native Speakers of English</i>	Speech Language Pathology	Drs. Monica Kaniamattam and Louise Keegan
11:20 AM	Anthony DiSipio <i>Environmental Effects on Group Dynamics in Shrimp</i>	Biology	Dr. Josh Lord
11:40 AM	Emily Saulino <i>Synthesis and Cytotoxicity Study of Novel Dirhodium Complexes</i>	Chemistry and Biology	Drs. Stephen Dunham and Anastasia Thévenin

SESSION II

Oral Presentations Session II: Moderator - Dr. Schmidt HUB UBC Room			
12:50 PM	Mary Mountain, Issac Weston, Antoinette Boulos, Christina Carty, Jennifer Leguizamon <i>Spectrograph Comparison of Four Speakers</i>	Health Sciences	Drs. Monica Kaniamattam and Louise Keegan
1:10 PM	Rachael Shaffer, Alec Aloia, Kyle Brandon, Barbara Yurchishin <i>Social Judgments About the Speech of Non-native English Speakers: A Survey</i>	Health Sciences	Drs. Monica Kaniamattam and Louise Keegan
1:30 PM	Blake Schuck, Jillian Kopchak, Catherine Gandolfo, Reagan Bonforte, N/A <i>An Exploration of Factors that Support or Hinder Speech Reading and Speech Perception</i>	Speech Language Pathology	Drs. Monica Kaniamattam and Louise Keegan

SESSION III

Oral Presentations			
Session III: Moderator - Dr. Shank			
HUB UBC Room			
2:00 PM	Garrison Koch	Mathematics	Dr. Nathan Shank
	<i>A Bipartite Graph Reduction Game (And its Relation to Double Choco Puzzles)</i>		
2:20 PM	Delanie Crabtree	Biology	Dr. Sara McClelland
	<i>Exposure to Ecologically Relevant Levels of a Carbamate Pesticide Causes Changes in Brain Structure in a Model Organism: What Does This Mean For Us?</i>		
2:40 PM	Edward Krejsa	Art	Angela Fraleigh
	<i>Perspective - An Art Experience</i>		

SESSION IV

Oral Presentations			
Session IV: Moderator - Dr. Schmidt			
PPHAC 101			
3:35 PM	Rose Michetti	Music	Dr. Hilde Binford
	<i>Moravian Music: Creating Performance Editions from the Archives</i>		
3:55 PM	Tyler Clemente	History	Dr. Heikki Lempa
	<i>Was the French Revolution a Religious Revolution? Maximilien Robespierre and the Cult of the Supreme Being</i>		

POSTER SESSION I

12:00 - 1:00 PM Poster Presentations I HUB Gallery		
Students		Advisor
Fabiana Popolla <i>Shelter Competition in Grass Shrimp</i>	Biology	Dr. Josh Lord
Samantha Flickinger <i>Predator-Prey Interaction Between Grass Shrimp and Mummichog Fish</i>	Biology	Dr. Josh Lord
Danielle Hanson <i>From Buddhism to Kierkegaard: How Philosophy Can Help Us Cope with Anxiety</i>	Philosophy	Dr. Carol Moeller
Eliza Grigsby <i>Do Selenium Antioxidants Affect the Mechanism of Bacterial-induced Macrophage Death?</i>	Biology	Dr. Kara Mosovsky
Charlotte Reid <i>Cellular Targets of Novel Dirhodium Complexes</i>	Biochemistry	Drs. Shari Dunham and Anastasia Thévenin
Gabrielle Demchak, Paul Petre, Geoffrey Kleinberg, Caillie Fish, Madison Meyers <i>Notakto</i>	Mathematics	Dr. Nathan Shank
Rim Turk <i>Role of Gap Junction Phosphorylation by MAP Kinases in Src Recruitment from Cancer Cells</i>	Biochemistry	Dr. Anastasia Thévenin
Liz Perez <i>Regulation of Src and Cx43 Interaction in Mammalian Cells by MAPKs</i>	Biochemistry	Dr. Anastasia Thévenin
Damian Wasieczko <i>The Protective Potential of Capsaicin in the 6-Hydroxydopamine Rodent Model of Parkinson's Disease</i>	Neuroscience	Dr. Cecilia Fox
Zachary Filliben <i>The Role of Capsaicin in the Restoration of Dopamine Neurons Following 6-Hydroxydopamine Neurotoxicity</i>	Neuroscience	Dr. Cecilia Fox
Yzatis Nieves <i>Learning From Nature: Using Play to Learn in a College Course</i>	Biology	Dr. Sara McClelland
Calum Taft-Lockard, William Reinert, Juliana Vojtash <i>Modular Arithmetic on Collatz-like Problems</i>	Mathematics	Dr. Nathan Shank
Mitchell Melnick <i>Interactions of a Fluorescein-tagged DNA Duplex with Rhodium Compounds</i>	Biochemistry	Dr. Shari Dunham
Jared Stafford, Kyle Dixon <i>College Athlete Reactions to a Summer Psychological Skills Training Program</i>	Psychology	Dr. Bob Brill
Joelis Rodríguez Santos	Biology	Dr. Sara McClelland

Effects of Pesticide Contaminated Water on Tissue Regeneration

Chad Propst <i>Using GC-MS to Evaluate Rinsing for Pesticide Removal</i>	Chemistry	Dr. Alison Holliday
Gwen Kester, Rachel Byrne <i>Effects of Word Association on Gender Stereotypes</i>	Psychology	Dr. Sarah Johnson
Jonathan Hixson-Cooper <i>Synthesis of Dirhodium 3-Carbon Maleimide</i>	Chemistry	Dr. Steve Dunham

POSTER SESSION II

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

Students		Advisor
Emily Shingara, Nicholas Stulb <i>A Review of the APHA Policy Statements Related to the Health of Migrant, Immigrant, Refugee, and Displaced Populations, 1948-2020</i>	Public Health	Dr. Colleen Payton
Hannah Moody, Jefferson Cano Meneses <i>Clumsy Packing Tetrominoes in a Finite Space</i>	Mathematics	Dr. Nathan Shank
Nicoletta Capasso, Madison Houchens <i>Face Mask Observation at Moravian University During the COVID-19 Pandemic, 2021</i>	Public Health	Dr. Colleen Payton
Andrew Goodolf, Madison Houchens <i>A Logic Model Framework For Planning a Food Recovery Network Chapter at Moravian University, 2021-2022</i>	Public Health	Dr. Colleen Payton
Emily Prendeville, Samantha Rodriguez <i>Evaluation of a Student-led COVID-19 Social Media Campaign Across 31 Universities in the United States in 2021</i>	Public Health	Dr. Colleen Payton
Felcityie Lindsay <i>Interviews With Community Stakeholders Who Work With Immigrant and Refugees in Lehigh Valley, Pennsylvania</i>	Public Health	Dr. Colleen Payton
Nadea Dundore <i>A Comparative Evaluation of Two Models of In-Vitro Infections Utilized in Melioidosis Research</i>	Biology	Dr. Kara Mosovsky
Mikayla Rae Dennis <i>Pretreatment of Curcumin and Vitamin E as a Protective Measure in the 6-Hydroxydopamine Model of Parkinson's Disease</i>	Neuroscience	Dr. Cecilia Fox
Emma Miller <i>On the Expansion of Common Combinatorial Games</i>	Mathematics	Dr. Michael Fraboni
Rachel Riley	Biochemistry	Dr. Anastasia Thévenin

Student Oral Presentations I

**HUB UBC Room
11:00 – 11:55 AM**

Moderator: Dr. Shank

Title: Investigating the Acoustic Variability in the Production of /a/ Between Native and Non-native Speakers of English

Students: Kaleigh Weber, Rachel Kelly, Jessica Mann, Samantha Silliman

Advisor: Drs. Monica Kaniamattam and Louise Keegan

Location: UBC Room

11:00 AM - 11:15 AM

This class research project investigated acoustic characteristics of vowel /a/ produced by a native English speaker and two non-native English speakers through spectrographs. Each graph demonstrated varying formants, which are the frequencies of sounds produced and altered by the shaping of the vocal tract. PRAAT, a computer software utilized to evaluate speech, provided numerical values of the first three formant frequencies in each sample. The formants of the sound /a/ are created by the shaping of the vocal tract to increase and decrease frequencies, as well as amplify or dampen sound. All of the speakers are males in their thirties. The speaker's age of English development, regional origin, and other languages spoken all differed. Based on these characteristics, the practiced usage of articulators will differ, producing a variation of the formant frequencies for the same phoneme. The sets of formant data produced by PRAAT can be compared, resulting in relative fundamental frequencies. The two individuals who utilize English more often demonstrated similarities, whereas the individual whose primary use of English is at work, had a lower fundamental frequency. Despite these slight differences, they were not significant enough to attribute the perceptual difference to their respective accents.

Title: Environmental Effects on Group Dynamics in Shrimp

Students: Anthony DiSipio

Advisor: Dr. Josh Lord

Location: UBC Room

11:20 AM - 11:35 AM

*Our research examined environmental effects on group dynamics within grass shrimp (*Palaemon pugio*). The overall goal of this research was to figure out how shrimp behavior is influenced by the availability of shelter and by ocean acidification. One of the main reasons we decided to look into grass shrimp is because they are one of the few marine invertebrates that fight to establish social hierarchies. In the acidified treatments we bubbled in carbon dioxide to create seawater with pH 7.7 and compared this to shrimp behavior in controls at pH 8.1. We examined our video footage of shrimp behavior to see if the dominance hierarchies were still established, or if fighting was sporadic over time within the trials. We also exposed some shrimp to low pH conditions for two weeks prior to the experiment. The major preliminary conclusion was that dominance hierarchies were formed in the control and short-term trials but were weaker when exposed to a long-term reduction in pH. This suggests that the shrimp's social behavior could be altered due to climate change and the changing environment within the ocean.*

Title: Synthesis and Cytotoxicity Study of Novel Dirhodium Complexes

Students: Emily Saulino

Advisor: Drs. Stephen Dunham and Anastasia Thévenin

Location: UBC Room

11:40 AM - 11:55 AM

Transition metal-based chemotherapeutics have been used to treat a variety of cancers with cisplatin being the most prominent of these drugs. Many cancers become chemoresistant to cisplatin, so there is a need to explore the anticancer abilities of other transition metal complexes. Rhodium demonstrates cytotoxic effects in HeLa cervical cancer cells in the form of dirhodium tetraacetate (Rh2A4). However, Rh2A4 is known to be less cytotoxic than cisplatin. Modifications of Rh2A4 were made to increase its cytotoxicity. Four new dirhodium triacetate maleimide alkylamine (Rh2A3M-NH-R) complexes were synthesized and characterized. Each Rh2A3M-NH-R contained an alkylamine (NH2-R) substituent: benzylamine, cyclohexylamine, ethanolamine, glucosamine. A new screening method was developed using MTT reagent to compare the cellular viability of HeLa cancer cells treated with the four purified Rh2A3M-NH-R complexes and their crude reaction mixtures. This procedure was successful and will allow for future screens of many Rh2A3M + R-NH2 crude reaction mixtures to selectively determine the complexes that have the potential to be the most cytotoxic. Rh2A3M-cyclohexylamine was found to be the most cytotoxic at ~20 μ M, suggesting it is comparable in cytotoxicity to cisplatin. Current work is focused on determining the IC50 value for this complex to definitively compare its cytotoxicity to cisplatin.

Student Oral Presentations II

HUB UBC Room

12:50 – 1:45 PM

Moderator: Dr. Schmidt

Title: Spectrograph Comparison of Four Speakers

Students: Mary Mountain, Issac Weston, Antoinette Boulos, Christina Carty, Jennifer Leguizamon

Advisor: Drs. Monica Kaniamattam and Louise Keegan

Location: UBC Room

12:50 PM - 1:05 PM

Jitter, shimmer, pitch, and intensity are all important identifying factors in a person's voice. Jitter is the variation in pitch in the voice. Shimmer measures the difference in amplitude from each voice cycle. We analyzed the patterns of these differences between speakers. The goal of this research was to study how different accents and variations in speech can affect these factors, and how these factors interact. To do this, we had four speakers with different accents and variations in speech say the same sentence, then we used the Praat program to find a value for each of the factors for each word in the sentence. We found that accent and speech variation had a noticeable effect on the factors we studied. The results are significant because research into language differences can help speech-language pathologists in their work.

Title: Social Judgments About The speech of Non-native English Speakers: A Survey

Students: Rachael Shaffer, Alec Aloia, Kyle Brandon, Barbara Yurchishin

Advisor: Drs. Monica Kaniamattam and Louise Keegan

Location: UBC Room

1:10 PM - 1:25 PM

Language attitudes play a crucial role in interpersonal communication. Given the demographic changes of the USA, it is important to study attitudes and perceptions towards non-native accent speakers. As part of a class research project for Introduction to speech and hearing sciences, we conducted a survey-based study exploring the attitudes of native speakers of English towards the speech of non-native speakers of English. The attitudes, beliefs and perceptions of native English speakers were assessed using an online survey embedded with speech samples of three speakers reading a passage. Speech samples were collected from three males in their 30s who had graduate degrees. The speakers included two non-native English speakers and one native speaker of standard American English. Thirty-seven respondents ranging in age from 18 to 50+ and with a high school diploma to a bachelor's degree responded to the survey. Our findings revealed that the speakers using

standard American English were rated more positively than speakers using a non-native accent on items; the former was rated as more intelligent and clear. Our presentation will highlight some key findings.

Title: **An Exploration of Factors that Support or Hinder Speech Reading and Speech Perception**
Students: Blake Schuck, Jillian Kopchak, Catherine Gandolfo, Reagan Bonforte
Advisor: Drs. Monica Kaniamattam and Louise Keegan
Location: UBC Room 1:30 PM - 1:45 PM

There are various factors that contribute to differences in human speech perceptions, including: biological, environmental, personal, cognitive, communicative, patient history, and many other factors. Some of these factors that we examined include sentence length, speech rate, lip-reading skill, facial expression, and background noise. This presentation highlights the results of a class experimental project that examined the speech-reading skills of eight individuals with normal hearing in audio only, visual only, and audio and visual situations, with the addition of background noise or no background noise. Speech perception skills were found to be best in the audio-visual condition without background noise. Findings from our study emphasize the importance of environmental modifications that support communication among individuals with hearing loss, dementia, and other communication disorders. Speech-language pathologists and other hearing health care providers should limit background noise and promote audio-visual communication support for all individuals in their caseload, especially those with limited hearing and cognitive challenges.

Student Oral Presentations III

HUB UBC Room

2:00 – 2:55 PM

Moderator: Dr. Shank

Title: **A Bipartite Graph Reduction Game (And its Relation to Double Choco Puzzles)**
Students: Garrison Koch
Advisor: Dr. Nathan Shank
Location: UBC Room 2:00 PM - 2:15 PM

This talk introduces a single player game on a game-labeled bipartite graph G , where each move is a reduction across an edge and no move produces a negative label. The goal of the game is to reduce all labels in the graph to 0, and if the player succeeds in doing so, the player wins the game. We present a necessary and sufficient sum condition for detecting the solvability of the game. We also demonstrate the connection between this game and Double Choco Puzzles.

Title: **Exposure to Ecologically Relevant Levels of a Carbamate Pesticide Causes Changes in Brain Structure in a Model Organism: What Does This Mean For Us?**
Students: Delanie Crabtree
Advisor: Dr. Sara McClelland
Location: UBC Room 2:20 PM - 2:35 PM

*Carbaryl is a common carbamate pesticide used for combating insect infestations. Like other pesticides, carbaryl has been found to contaminate natural habitats through run-off and can be found in very small concentrations as residues on food, exposing humans and other vertebrate animals to this chemical. While high dose exposures have been studied, it is still unclear how low dose exposures, more commonly encountered in nature, impact health and physiology. We hypothesized that environmentally realistic exposures to carbaryl would impact neurodevelopment and behavior. To test this hypothesis, we used Pickerel Frog (*Lithobates [Rana]**

palustris) tadpoles as model organisms. Tadpoles are often used as vertebrate models for development and toxicology because their developmental processes are similar to those in other vertebrates. In this experiment, tadpoles were exposed to either 0 ppb, 1 ppb, or 10 ppb of carbaryl in a blind laboratory experiment. After two weeks of exposure, three behavioral assays were performed to test boldness, olfactory sensitivity, and muscle movement, and then body and brain morphology were analyzed. Results showed an effect of 1 ppb carbaryl on the size of the brain. Future studies are still needed, but this work demonstrates that low-dose carbamate exposures can impact vertebrate neurodevelopment.

Title: Perspective - An Art Experience

Students: Edward Krejsa

Advisor: Angela Fraleigh

Location: UBC Room

2:40 PM - 2:55 PM

Perspective is something that cannot be understood without thought and consideration of some kind. My art references these unique concepts through symbolologies and movement and color usage. By forcing a perspective to a viewer it allows me to display these ideologies and beliefs upon those who gaze and think. Charcoal is used to highlight shadows and movement while the pastels are used to highlight color and meanings. Research of flowers and objects and colors are used to emphasize certain details within the pieces. Utilization of these concepts collectively is what makes my pieces special and critical in understanding these concepts and understandings.

Student Oral Presentations IV

HUB Amrhein Room

3:35 - 4:10 PM

Moderator: Dr. Schmidt

Title: Moravian Music: Creating Performance Editions from the Archives

Students: Rose Michetti

Advisor: Dr. Hilde Binford

Location: Amrhein Room

3:35 PM - 3:50 PM

For my SOAR project, I had access to several original music manuscripts held in the Moravian Archives. I edited three manuscripts for modern performance as well as future publication by typing it into a music notation software program. The pieces I worked on included two movements of a Mass by Italian composer Jean-Joseph Fiocco, a choral motet by German Philipp Christoph Kayser, and an organ liturgy by Moravian composer Johann Peter Fruauff. I also did extensive research on the composers of these pieces and the German script that the text was written in. The project gave me an insight into the editing process that musical scores go through before it is published and performed, as well as a deeper look into the Moravian music tradition.

Title: Was the French Revolution a Religious Revolution? Maximilien Robespierre and the Cult of the Supreme Being

Students: Tyler Clemente

Advisor: Dr. Heikki Lempa

Location: Amrhein Room

3:55 PM - 4:10 PM

Maximilien Robespierre was the ideologue of the French Revolution. But what role did he play in shaping religion? Specifically, what was his goal in creating the Cult of the Supreme Being in 1794? Peter McPhee argues that Robespierre created the religion as a tool to maintain power, whereas Jonathan Smyth contends that his goal was to unify France under a theistic religion. To understand Robespierre's intentions, I analyzed several of his renowned speeches and writings. I juxtaposed those produced before Robespierre's political career, such as

“On Voting Rights,” with those from late 1793 and 1794, especially “On the Enemies of the Nation.” Most notable was the change in Robespierre’s concept of virtue— from public virtue to an intensified virtue that was tied to terror. I argue that Robespierre created the Cult of the Supreme Being to solidify himself as head of the Revolution but also to advance the Revolution itself. Finally, I question the extent to which Robespierre successfully met his goals of creating the religion. Had the once “Incorruptible” become corrupted by his political miscalculations? Further, what does the Cult of the Supreme Being reveal about religion and revolutions?

Student Poster Presentations I

HUB Gallery

12:00 - 1:00 PM

Title: Shelter Competition in Grass Shrimp
Students: Fabiana Popolla
Advisor: Dr. Josh Lord
Location: HUB Gallery

*The grass shrimp *Palaemon pugio* is a common and abundant species that lives in marshes along the Atlantic coast. Previous studies have shown that they fight to form a dominance hierarchy, but research has not been done to assess how these fights play out in large groups and how aggression is linked to habitat. My research assessed the intra-specific competition for space and shelter use, and quantified aggression both in and around artificial shelters. By analyzing videos of interactions between ten large and small-clawed shrimp in an arena with an artificial shelter for thirty minutes, I was able to understand how claw size relates to habitat use. High levels of aggression from the large-clawed shrimp prevented small-clawed shrimp from utilizing the shelter. As these shrimp are ecologically important and are prey for a wide variety of estuarine fish, gaining access to shelter (if possible, given their rank in the hierarchy) can help secure their survival.*

Title: Predator-Prey Interaction Between Grass Shrimp and Mummichog Fish
Students: Samantha Flickinger
Advisor: Dr. Josh Lord
Location: HUB Gallery

*Although grass shrimp, *Palaemon pugio*, have a significant ecological role in estuaries on the Atlantic coast, they are greatly understudied. The primary predator of *P. pugio* is the mummichog fish, *Fundulus heteroclitus*, but there is currently little known about their interactions. Aggression between these two species has been previously observed but had not been experimentally tested to better understand their relationship. In this experiment, we explored aggressive interactions between fish and shrimp. In order to quantify aggression exhibited by fish and grass shrimp, we used varying sizes of both predator and prey and explored whether size had a significant effect on their behavior. Grass shrimp have social hierarchies, so we compared the aggression between dominant and subordinate shrimp in order to identify behavioral differences when exposed to predation. Fish of varying sizes were placed in a tank with 10 shrimp. There were 15 replicates of the same sizes and groups of shrimp and fish used to assess the major differences in the relative frequency of their interactions. Our results suggest that *P. pugio* and *F. heteroclitus* have a complex predator-prey relationship and that size plays a major role in aggression between these two species.*

Title: From Buddhism to Kierkegaard: How Philosophy Can Help Us Cope with Anxiety
Students: Danielle Hanson
Advisor: Dr. Carol Moeller
Location: HUB Gallery

This project takes a look at anxiety through the lens of philosophy. It explores 3 major philosophical traditions: (1) Buddhism (2) Stoicism and (3) Existentialism to pull out techniques and beliefs that can be helpful for decreasing chronic anxiety.

Title: Do Selenium Antioxidants Affect the Mechanism of Bacterial-induced Macrophage Death?

Students: Eliza Grigsby
Advisor: Dr. Kara Mosovsky
Location: HUB Gallery

Melioidosis, caused by the naturally antibiotic-resistant bacteria Burkholderia pseudomallei, is a deadly disease in many tropical climates and is especially prevalent in Southeast Asia and Australia. The current treatment is long and expensive, and even with proper treatment, mortality rates can be high. Our lab studies treatment options in vitro using macrophages that are infected with a related Burkholderia species. We previously showed that the dietary antioxidant seleno-L-methionine (SeMet) was capable of reducing the intracellular bacterial burden of the infected macrophages. Surprisingly, the effect of the antioxidant was about as powerful as an antibiotic treatment in protecting the infected macrophages. We also previously found that the antioxidant treatment protected the membranes of infected macrophages, preventing cell death in those infected cells. The mechanism of that protection became the target of our current investigation. We used color-based assays and western blotting in an attempt to quantify pyroptosis and apoptosis, respectively. Through this work, we were able to eliminate the involvement of pyroptosis. Our western blots to quantify apoptosis were inconclusive. Future research will continue to fine-tune our procedure. Through understanding which cell death pathways are involved in this infection and the antioxidant treatment, we can better understand possible treatments for melioidosis.

Title: Cellular Targets of Novel Dirhodium Complexes

Students: Charlotte Reid
Advisor: Drs. Shari Dunham and Anastasia Thévenin
Location: HUB Gallery

Cisplatin is a commonly prescribed cancer treatment that kills cancer cells by binding to nuclear DNA. While this treatment is a prevalent chemotherapeutic in medicine, it also has harmful side effects including nausea, vomiting, kidney damage, neurotoxicity, and hearing loss. Because of these negative aspects of cisplatin, potential anticancer complexes containing rhodium and their effect on cancer cells have been studied in our laboratory, as well as by others. Thus, we hope to discover a potential novel chemotherapeutic. The goal of this work was to determine the cell-killing ability (cytotoxicity) of dirhodium complexes that contain a variety of bridging carboxylate ligands, including acetate, trifluoroacetate, gluconate, and glucuronate. In our cytotoxicity studies of these compounds, the dirhodium complex with four acetate ligands has been the most cytotoxic. Most interestingly, one of these complexes displays greater toxicity in triple-negative breast cancer cells than in cervical cancer cells. This is an exciting observation as cisplatin was not as toxic in these triple-negative cells, and this particular breast cancer is difficult to target and treat. In addition to comparing the anticancer activity of these novel dirhodium complexes to cisplatin, we hope to determine how these dirhodium complexes interact with and kill cancer cells.

Title: Notakto

Students: Gabrielle Demchak, Paul Petre, Geoffrey Kleinberg, Caillie Fish, Madison Meyers
Advisor: Dr. Nathan Shank
Location: HUB Gallery

Notakto is a two-player combinatorial game that is based on Tic-Tac-Toe played with two players on an $n \times n$ board, however, the rules differ slightly. In the rendition of the game, you do not want to be the one who creates

n in a row on the board. In conjunction with that rule, both players also use the same piece and the game has each player alternate turns to place Xs on the board. The game is over when someone gets four in a row. Our project looks to build off previous findings on this game and build solutions and strategies for how player 1 or player 2 will always win their respective games. The strategy works on a grid system and we are trying to create a strategy that gives the winning player an optimal strategy. We are looking for patterns in larger boards to allow us to generalize to any $n \times n$ board based on the winner of the game.

Title: Role of Gap Junction Phosphorylation by MAP Kinases in Src Recruitment from Cancer Cells

Students: Rim Turk
Advisor: Dr. Anastasia Thévenin
Location: HUB Gallery

Gap Junctions (GJs) are intercellular structures that allow communication between adjacent cells. Connexin 43 (Cx43) is a transmembrane protein that is an integral component of GJs. The C-terminus (CT) of Cx43 is modified at many serine and tyrosine residues; the most common modification is phosphorylation and it's known to regulate many GJ functions, such as opening and closing of GJs, GJ assembly at the plasma membrane, and GJ internalization and degradation. On the CT of Cx43, there is a binding region for a proto-oncogene, Src, which is upregulated in many types of cancer cells. While Cx43 is often lacking in cancer cells, it has been shown that adding it ectopically can serve as a tumor suppressor in Src-driven cancer cells. Mitogen-activated protein kinases (MAPKs) also phosphorylate Cx43 at or near the Src binding region, decreasing GJ intracellular communication (GJIC). Current work is focused on examining the effect of MAPK phosphorylation on the interaction between Cx43 and Src, as well as further studying the binding interactions between Src and site S255 of Cx43 in mammalian cells.

Title: Regulation of Src and Cx43 Interaction in Mammalian Cells by MAPKs

Students: Liz Perez
Advisor: Dr. Anastasia Thévenin
Location: HUB Gallery

Connexin 43 (Cx43) is a protein constituent of gap junctions (GJs) - cellular structures that allow cells to communicate. Cx43 function is regulated through phosphorylation along its 140-amino acid long, cytoplasmic C-terminus. In cancer cells, Cx43 is able to recruit and inhibit a potent oncogene, Src, thus decreasing Src's effects on cell proliferation. Residues 266-283 on Cx43 serve as a recruitment site for Src and our laboratory has identified that mimicking phosphorylation at S255, S279 and S282 prevents Cx43/Src interaction. While phosphorylation of Cx43 at these sites by a mitogen activated protein kinase (MAPK) family member ERK has been well-established, it is not clear if the other two MAPKs - JNK and p38 - are able to phosphorylate Cx43, and thus regulate Cx43/Src interaction. Our in vitro experiments between purified Cx43 C-terminus and active MAPKs demonstrate that ERK, JNK and p38 display differential substrate specificity toward Cx43. Ongoing work in two mammalian cell lines indicates that through a use of ERK, JNK and p38 activators and inhibitors, we are able to achieve cellular conditions where only one MAPK is active at a time, allowing us to test the effects of each MAPK on regulating Cx43/Src interaction in cells.

Title: The Protective Potential of Capsaicin in the 6-Hydroxydopamine Rodent Model of Parkinson's Disease

Students: Damian Wasieczko
Advisor: Dr. Cecilia Fox
Location: HUB Gallery

Parkinson's disease (PD) is a neurodegenerative condition that results from the loss of dopamine neurons within the nigrostriatal pathway. One source of this damage is due to chronic neuroinflammation that accompanies

oxidative stress. The anti-inflammatory and antioxidant properties of capsaicin have shown promise in helping prevent damage from these modalities in the 6-hydroxydopamine (6-OHDA) rat model of PD. This study examined the protective effect of capsaicin on rodents exposed to an intranigral 6-OHDA lesion. The experimental group received 0.5 mg/kg injections of capsaicin contained within a 0.1 mL vehicle of DMSO, while the control animals received only the vehicle. These intraperitoneal injections of capsaicin or its vehicle were performed three times a week for six weeks prior to 6-OHDA exposure. The rats were subjected to behavior testing before and after the capsaicin treatment, which included the rotarod, foot-fault, and cylinder tests. Two weeks post-surgery, the rats were euthanized, and their brain tissue processed for tyrosine hydroxylase immunocytochemistry. The survival rate of the dopamine neurons within the substantia nigra is being assessed via stereology. Based on the behavior data thus far, intraperitoneal injections of capsaicin may be a promising approach to mitigating the degeneration of dopamine neurons in this rat model of PD.

Title: The Role of Capsaicin in the Restoration of Dopamine Neurons Following 6-Hydroxydopamine Neurotoxicity

Students: Zachary Filliben

Advisor: Dr. Cecilia Fox

Location: HUB Gallery

Parkinson's Disease (PD) is a motor disorder resulting from the loss of dopamine neurons within the nigrostriatal pathway via oxidative stress and neuroinflammatory processes. Capsaicin, a powerful anti-inflammatory with antioxidant properties, has been shown to decrease both peripheral and central nervous system inflammation in the 6-hydroxydopamine (6-OHDA) rat model of PD. In the current study, all animals received a 6-OHDA lesion within the right substantia nigra. Following surgery, the animals were randomly divided into three different treatment groups: 0.25 mg/kg of capsaicin, 0.5 mg/kg of capsaicin, and vehicle of DMSO. Capsaicin or the vehicle were delivered intraperitoneally three times a week following surgery for six weeks. All animals underwent baseline and post-treatment behavior testing to assess any changes in motor function. The behavior tests used were the foot fault, cylinder, and rotarod. Following euthanasia, the brain tissue was stained for tyrosine hydroxylase using immunocytochemistry and dopamine neuron survival is currently being quantified.

Title: Learning From Nature: Using Play to Learn in a College Course

Students: Yzatis Nieves

Advisor: Dr. Sara McClelland

Location: HUB Gallery

Gamification, using elements of games and playing, in education has been shown to increase retention of information with students reporting more enthusiasm for learning when play is involved in their education. The purpose of this project is to use gamification to develop a novel classroom activity for learning about vertebrate zoology. I am hypothesizing that students will show increased retention of information when provided with a playful card game activity as compared to an alternative more traditional learning assignment. To test this hypothesis, students will be placed in either the traditional or alternative/play learning groups and given an assignment in which they are asked to gather and present information on a vertebrate organism. Student learning will be measured by using a rubric to score their presentations, a quiz, and a survey presented to them after the experiment is conducted for feedback on the activity. I plan to conduct this study early in the spring 2022 semester. I hope to observe that with better avenues of learning that are fun and stray from the more common and traditional assignments, that students will learn more effectively and demonstrate an increased enthusiasm for learning. If scores are higher on the assessments for those in the alternative/play group than the traditional assignment group, it will provide evidence that students exhibit greater retention of the material taught when learning through play.

Title: **Modular Arithmetic on Collatz-like Problems**
Students: Calum Taft-Lockard, William Reinert, Juliana Vojtash
Advisor: Dr. Nathan Shank
Location: HUB Gallery

In this project, we explore possible solutions to the Collatz conjecture using modular arithmetic on a generalized form of the Collatz function. Using a program developed in Python, we analyzed some patterns that had emerged through our work. While this started with strictly looking at the Collatz conjecture, our work quickly took on a form of its own. Many questions are now being asked that will guide current and future research which could result in a meaningful solution to the conjecture.

Title: **Interactions of a Fluorescein-tagged DNA Duplex with Rhodium Compounds**
Students: Mitchell Melnick
Advisor: Dr. Shari Dunham
Location: HUB Gallery

Metal-based compounds are used in the clinic to successfully treat certain cancers, with each medicinal compound having a distinct therapeutic window. A goal of this project is to react novel rhodium compounds with a DNA duplex of known sequence and monitor the formation of DNA crosslinks. A 34-mer duplex is being used which contains all possible trinucleotide sequence combinations and has a covalently linked hexachlorofluorescein on the 5' end of one strand to allow for visualization without staining. Molecular and atomic spectroscopy methods were used to determine the concentrations of DNA and rhodium, respectively, in an incubated sample. Gel electrophoresis methods were then used to identify the presence and quantity of rhodium adducts that cross-link the two strands of the DNA duplex. By identifying and quantifying the DNA adducts formed by different rhodium compounds, we hope to open the door to new anticancer drugs with potentially wider therapeutic windows.

Title: **College Athlete Reactions to a Summer Psychological Skills Training Program**
Students: Jared Stafford, Kyle Dixon
Advisor: Dr. Bob Brill
Location: HUB Gallery

*Researchers have empirically supported positive outcomes from interventions that have focused on Psychological Skills Training among college and youth athletic teams (Kiener, 2019; Kiens & Larsen, 2021). Over the summer of 2021 Moravian Men's Soccer program implemented an optional reading program of Spencer's (2016) *Mind of the Athlete*, which included three discussion session opportunities across the summer months. Eighteen team members (56.25%) participated in at least one session. Both quantitative and qualitative measures were used to assess the impact of the program. Mixed results from the program assessment on knowledge, attitude, and use of psychological skills, as well as perceptions of team cohesion across three measurement phases, will be shared. Limitations and implications for future research and practice, including a subsequent planned team-building event, will be discussed.*

Title: **Effects of Pesticide Contaminated Water on Tissue Regeneration**
Students: Joelis Rodríguez Santos
Advisor: Dr. Sara McClelland
Location: HUB Gallery

*Freshwater planarians (*Dugesia tigrina*) have been used as model organisms for stem cell regeneration and toxicology research due to their regenerative capabilities and their relatively advanced central nervous system. Malathion, a man-made organophosphate that is commonly used as an insecticide in agriculture, can cause adverse effects on ecosystems. Invertebrates, such as planarians, are highly sensitive to environmental chemicals*

and can be used as bioindicators of the quality of freshwater environments. The goal of this research is to investigate malathion's effect on planarian regeneration. In this experiment, flatworms will be exposed to either 0µg/L or 1 µg/L of malathion. Flatworm heads will be split from the bodies and flatworms will remain in 50 mL of treated water for two weeks. Pictures will be taken and used to measure the progress of regeneration. We are hopeful that this study can give us insights into how exposure to environmentally realistic concentrations of an environmental toxin might impact the ability to regenerate tissues, which could have implications for both the regeneration process and wound healing in animals.

Title: Using GC-MS to Evaluate Rinsing for Pesticide Removal

Students: Chad Propst

Advisor: Dr. Alison Holliday

Location: HUB Gallery

Strawberries top the USDA's list of pesticide usage in America. Among these pesticides used, Captan is the most commonly used pesticide on strawberries. The removal of pesticides is important for the consumption of commercial produce and this research aims to test the efficacy of pesticide removal under running water compared to an unwashed strawberry of the same concentration of captan. The strawberry samples were washed off in acetonitrile and 1.0mL samples were taken and analyzed using the GC-MS and compared to an internal standard. The internal standard used was a solution of Captan D-6 kept at a constant concentration. The internal standard was also used to compensate for the degradation of regular Captan as they should degrade at the same rate. It was found that the cleanliness of the injection port of the GC-MS system had a direct impact on the signal output for Captan, and was replaced periodically to adjust for this. Through triplicate tests it was found that washing strawberries under running water removed roughly 90% of the applied pesticide compared to the unwashed version using the same process.

Title: Effects of Word Association on Gender Stereotypes

Students: Gwen Kester, Rachel Byrne

Advisor: Dr. Sarah Johnson

Location: HUB Gallery

Stereotypes associated with character traits, objects, occupations and athletics were examined using a survey, which included brief character biographies to assess the relationship between gender and characteristics of an individual, and how scientific they are, however this is not focused on in this presentation. The second part of the survey required 32 participants to consciously rate words by gender (chair, chemistry, running), where 0 was masculine, 50 was neutral, and 100 was feminine. This study investigated why some words are to be more gendered than others. The athletic category explored gendering of different sports while the science category explored gendering of different sciences. The explicit rating showed that there are many gender associations between athletics and scientific fields with the significant words/categories and their means consisting of "Engineering" (27.61), "Gym" (36.56), "Lacrosse" (33.70), along with others. Understanding the assumptions that language can enforce on people, leading to false memories and framing effects, which often come into play during criminal hearings and trials. This can result in wrongful incarceration simply due to word play against suspects or victims.

Title: Synthesis of Dirhodium 3-Carbon Maleimide

Students: Jonathan Hixson-Cooper

Advisor: Dr. Steve Dunham

Location: HUB Gallery

Dirhodium compounds have shown promise as chemotherapeutics. The goal of this research is to synthesize a new dirhodium compound by adding a reactive maleimide group to the dirhodium compound. The new dirhodium-maleimide compound could then be reacted with a variety of amines or other organic compounds to

synthesize several possible chemotherapeutics. A new dirhodium-3-maleimide compound was synthesized by removing trifluoro acetate from the dirhodium starting material and replacing it with 3-Maleimido-propionic acid. The reaction was monitored via HPLC using absorbance at 220 and 254 nm. The structure was confirmed using ¹H NMR and ¹³C NMR as well as 2D ¹H-¹H and ¹H-¹³C NMR. The dirhodium-3-maleimide was reacted with four different amines. These amines were cyclohexylamine, ethanolamine, glucosamine, and benzylamine. Of these amines, cyclohexylamine gave the most defined reaction products.

Student Poster Presentations II

PPHAC Atrium

4:00 - 5:00 PM

Title: A Review of the APHA Policy Statements Related to the Health of Migrant, Immigrant, Refugee, and Displaced Populations, 1948-2020
Students: Emily Shingara, Nicholas Stulb
Advisor: Dr. Colleen Payton
Location: PPHAC Atrium

Introduction: There are 281 million migrants and 82.4 million persons forcibly displaced worldwide. Policies are needed pertaining to the health of migrant, immigrant, refugee, and displaced populations.

Purpose: To identify the prevalence of policy statements and themes pertaining to migrant, immigrant, refugee, and displaced populations published within the APHA policy database between 1970 to 2020.

Methods: A cross-sectional study design was used to evaluate policies from the APHA policy database. Policies were categorized as primary if they were mainly about migrant, immigrant, refugee, and displaced populations. Policies were categorized as secondary if those populations were mentioned but not the main part of the policy. Policies were analyzed for themes.

Results: 123 total policy statements were identified including 37 (30%) primary and 86 (70%) secondary. There were an average of 0.74 primary policies and 1.72 secondary policies per year. Major themes included opposing violations at borders and detention centers, reducing health disparities, and increasing access to public health services, language services, occupational safety, and higher education.

Discussion: APHA should continue to write policy statements that primarily focus on migrant, immigrant, refugee, and displaced populations with the goal of increasing related public health services to address population needs.

Title: Clumsy Packing Tetrominoes in a Finite Space
Students: Hannah Moody, Jefferson Cano Meneses
Advisor: Dr. Nathan Shank
Location: PPHAC Atrium

Polyominoes are a set of adjacent cells that will be placed in a fixed orientation. Specifically, a tetromino is a four celled polyomino such as the game pieces in Tetris. We will be focusing on T-shaped tetrominoes. Clumsy packing can be defined as the minimum amount of polyominoes placed on a board such that no other polyomino can fit on a board. In this paper, we will be considering how to inefficiently place tetrominoes on a finite board. We explore equations and repeated patterns on a board to better understand how to inefficiently place polyominoes. In addition, we will explore the idea of gravity and how it may affect the clumsy packing on a finite board.

Title: Face Mask Observation at Moravian University During the COVID-19 Pandemic, 2021

Students: Nicoletta Capasso, Madison Houchens

Advisor: Dr. Colleen Payton

Location: PPHAC Atrium

Introduction: The CDC recommends face masks to protect individuals from SARS-CoV-2 transmission via respiratory droplets.

Purpose: To measure the proportion of people wearing face masks correctly on Moravian University's campus during the COVID-19 pandemic in 2021.

Methods: A cross-sectional design was conducted among students, faculty and staff at Moravian University in Bethlehem, Pennsylvania during 2021. Face mask behavior was observed at three inside locations on campus using the CDC MASCUP protocol. Mask behavior was defined as correctly, incorrectly, or no mask. Type of mask was documented (cloth, surgical, N95, neck gaiter or other). Descriptive statistics were conducted.

Results: Among 769 people observed during 56 observation periods, 85% were wearing a mask correctly, 14% incorrectly, and <1% were not wearing a mask. Correct mask behavior varied by location: PPHAC (84%), HUB (85%), and Sally (87%). Mask types worn included surgical mask (65%), cloth mask (35%), and other masks (<1%).

Discussion: Almost all students wore a mask, but 15% wore a mask incorrectly. Indoor mask mandates and surgical masks provided on campus likely contributed to high rates of wearing masks. Masks were worn incorrectly closer to cafeterias and after students were leaving classes. Public health interventions should focus on correct mask behavior.

Title: A Logic Model Framework For Planning a Food Recovery Network Chapter at Moravian University, 2021-2022

Students: Andrew Goodolf, Madison Houchens

Advisor: Dr. Colleen Payton

Location: PPHAC Atrium

Introduction: The Food Recovery Network is a student-led organization aimed at reducing food waste and stopping hunger.

Purpose: To describe the planning of a Food Recovery Network Chapter at Moravian University using a public health logic model and the outcomes of a campus-wide food drive, an initial on-campus activity for the chapter.

Methods: A public health logic model was created to plan a food recovery network chapter, including inputs, outputs, and outcomes. The campus-wide food drive donations were categorized as food, toiletries, and cleaning supplies as well as by the donors. Data was analyzed in Excel and descriptive statistics were conducted.

Results: The main short-term outcome includes increased advocacy, the main medium-term outcome includes 35 hours of volunteering towards a nonprofit organization, and the long-term outcome includes delivering food to community-based organizations. 1,618 items including non-perishable food, toiletries and cleaning supplies were collected during the 4 week food drive. 548 pounds of donations were given to New Bethany Ministries.

Discussion: This logic model has been useful to set priorities for a Food Recovery Network Chapter and allow for continuity as students graduate. The model presented here could support the planning of other Food Recovery Network Chapters at other campuses.

Title: Evaluation of a Student-led COVID-19 Social Media Campaign Across 31 Universities in the United States in 2021

Students: Emily Prendeville, Samantha Rodriguez
Advisor: Dr. Colleen Payton
Location: PPHAC Atrium

Introduction: The COVID Campus Coalition is a student-led, social media campaign that utilizes Instagram to provide COVID-19 vaccine information to university students.

Objective: To evaluate the engagement and themes from the 31 COVID Campus Coalition's Instagram accounts at university campuses in 2021.

Methods: A cross-sectional study of 31 COVID Campus Coalition Instagram accounts was conducted in 2021. Quantitative data included the number of posts, followers, accounts following, story highlights, likes, and account duration. Pearson correlations were conducted. Qualitative comments were analyzed for themes.

Results: There were an average of 10.55 posts, 164.35 followers, 270.55 accounts following, 5.32 saved story highlights, 153.90 likes, and 3.00 comments across the 31 accounts over an average of 170.58 days. There were statistically significant positive correlations between the number of posts and the number of followers ($r=0.49$, $p=0.01$), likes ($r=0.51$, $p<0.01$), and comments ($r=0.39$, $p=0.03$). Few accounts included videos or photos, which were associated with increased engagement.

Discussion: Results indicate that the number of posts positively correlates with account engagement. COVID Campus Coalition Chapters should increase posts including photos, videos, and messages tailored to each campus.

Title: Interviews With Community Stakeholders Who Work With Immigrant and Refugees in Lehigh Valley, Pennsylvania

Students: Felycitie Lindsay
Advisor: Dr. Colleen Payton
Location: PPHAC Atrium

Introduction: Immigrant and refugee populations face unique challenges that may contribute to adverse health outcomes. Approximately 7% of Pennsylvanians are immigrants.

Study Purpose: 1) Map the organizations that support immigrants and refugees in Lehigh Valley, Pennsylvania, 2) Interview leaders in the community about what they think are the barriers and solutions to supporting immigrants and refugees in Lehigh Valley, Pennsylvania.

Methods: PolicyMap was used to create a GIS map of the types of organizations that support immigrants (education, health, cultural, community, places of worship, law) over the base map of the percent foreign born population. Semi-structured interviews were conducted.

Results: A high proportion of organizations that serve immigrants and refugees are located in Allentown, Bethlehem, and Easton. Major barriers were related to language (ex: non-bilingual staff), legal process (ex: unlawful notaries), and healthcare (ex: lack of cultural humility). Potential solutions include language (ex: websites translated in multiple languages), long-term community collaboration (ex: sharing information and resources) and higher education (college student organization focused on welcoming refugees).

Discussion: More supportive services are needed as current administration plans for an increase in refugee arrivals. It is imperative to improve public health infrastructure for immigrant and refugee populations to keep the community thriving.

Title: A Comparative Evaluation of Two Models of In-Vitro Infections Utilized in Melioidosis Research

Students: Nadea Dundore

Advisor: Dr. Kara Mosovsky
Location: PPHAC Atrium

Burkholderia pseudomallei is an environmental bacterium most commonly found in places such as Southeast Asia and Northern Australia. *B. pseudomallei* causes a severe disease known as melioidosis, which has a high mortality rate. Available treatments for this disease are expensive and time-intensive. In our lab we use a model organism known as *Burkholderia thailandensis* and investigate potential therapies that could decrease the bacterial burden in host cells. There are two commonly used and published infection models in this field that differ in important ways. One is called the dynamic infection model (DIM) and the other is called the kanamycin protection assay (KPA). The goal of this study was to study both the advantages and disadvantages of each model by comparing 6-, 12-, and 18-hour infections using similar treatments in each model. Results have shown that nearly all of the parallel treatments between the two models led to statistically similar intracellular bacterial burdens indicating the two infection models may not be that different from each other after all. Future studies in our lab include comparing the two models with a focus on the extracellular bacterial burden.

Title: Pretreatment of Curcumin and Vitamin E as a Protective Measure in the 6-Hydroxydopamine Model of Parkinson's Disease

Students: Mikayla Rae Dennis
Advisor: Dr. Cecilia Fox
Location: PPHAC Atrium

This study explored the combined protective effect of the antioxidant, vitamin E and the anti-inflammatory, curcumin on dopamine neurons within the substantia nigra in a rodent model of Parkinson's disease. Previous studies in our lab have identified that intraperitoneal injections of curcumin can protect dopamine neurons as well as reduce activation of microglia in a 6-hydroxydopamine (6-OHDA) rodent model of Parkinson's disease. The purpose of this study was to build on this research to determine whether a combined curcumin-vitamin E therapeutic approach administered orally could also protect dopamine neurons in this model of Parkinson's disease. Animals underwent behavior testing to assess motor function prior to and following exposure to 6-OHDA using the foot fault, rotarod, and cylinder tests. Experimental animals were pretreated with curcumin and vitamin E for 6 weeks prior to their lesion while control animals only received the vehicle. All animals were euthanized two weeks post-surgery and their brain tissue processed for tyrosine hydroxylase immunocytochemistry. The percent survival of dopamine neurons remaining in the substantia nigra will be quantified to assess the extent of neuronal protection.

Title: On the Expansion of Common Combinatorial Games

Students: Emma Miller
Advisor: Dr. Michael Fraboni
Location: PPHAC Atrium

CRAM, TIC-TAC-TOE and HEX are all common games frequently studied with combinatorial game theory. We will consider expansions of these games. The game of CRAM is classically played with dominoes, a type of polyomino. We will consider a game of CRAM if larger pieces are used and study the game's outcome classes on specific boards. In addition, QUANTUM TIC-TAC-TOE is a common teaching metaphor in quantum mechanics whose rules, outlined by Allan Goff, can easily be applied to combinatorial games, changing the games to consider a new element of superposition. We discuss outcome classes of quantum games as well as good strategies for more classically complicated games such as HEX with the idea of superposition.

Title: Synergistic Inhibition of Src Activity in Prostate Cancer Cells by Connexin 43 and PTEN Proteins

Students: Rachel Riley
Advisor: Dr. Anastasia Thévenin

Location: PPHAC Atrium

Connexin 43 (Cx43) is a transmembrane protein that constitutes intercellular communication structures called gap junctions (GJs). Cx43 C-terminus is phosphorylated at many serine and tyrosine residues, and these modifications to the protein are known to regulate many GJ functions, such as trafficking of Cx43 through the secretory pathway, GJ assembly at the plasma membrane, opening and closing of GJs, as well as GJ internalization and degradation. Cx43 C-terminus contains a binding region for the oncogenic protein Src which is upregulated in many types of cancers. Recent work in our lab has identified that phosphorylation of S373 on Cx43 C-terminus results in greater binding, and therefore inhibition, of Src to Cx43 even though this residue lies well outside of the Src binding region. When Src binds to Cx43, cell proliferation and oncogenic activity decrease in cells, which means that Cx43 has the ability to serve as a tumor suppressor in Src-driven cancer cells. Current work is focused on determining whether the Src inhibitors Csk and PTEN can synergize with Cx43 and result in greater binding and inhibition of Src.

Title: A Health Needs Assessment and Logic Model Framework to Address Reproductive and Menstrual Health in Amilo Village, Kenya

Students: Mahum Naveed, Emily Shingara, Jennifer Leguizamon, Laura Roberts, Mathew Eroh

Advisor: Dr. Colleen Payton

Location: PPHAC Atrium

Introduction: The Alice Visionary Foundation Project is a U.S. non-profit organization and Kenya NGO aimed at increasing the quality of life for women and children through education, food security, safety, poverty reduction, and health.

Purpose: The study purpose was to 1) conduct a health needs assessment on reproductive and menstrual health in Amilo Village, Kenya, and 2) develop a public health logic model for a program to address these needs.

Methods: A health needs assessment was conducted that highlighted health needs in Amilo Village, Kenya including menstrual health and teen pregnancy. A health infographic was created to visualize these health needs. A public health logic model was created including inputs, outputs, and outcomes of a program to address reproductive and menstrual health.

Results: Low attendance in school, stigma surrounding reproductive health, and lack of access to community resources increase the risk of teen pregnancy and poor health outcomes. A program was designed to increase partnerships with organizations, training on how to use menstrual health products, and de-stigmatization to improve menstrual and reproductive health.

Discussion: Increased knowledge, attitudes, skills, and resources focused on menstrual health and safe sex practices could decrease the prevalence of teen pregnancy and improve menstrual health.

Title: A Health Needs Assessment and Logic Model Framework to Address Safe Internet Use Among Youth During the COVID-19 Pandemic in Amilo Village, Kenya

Students: Sarah Gross, Shannon Kemmerer, Brooke McElmoyle, Anthony Mosley, Christian Burda

Advisor: Dr. Colleen Payton

Location: PPHAC Atrium

Introduction: Alice Visionary Foundation Project (AVFP) is a Kenya international NGO and a U.S. non-profit that seeks to improve the quality of life for disadvantaged communities.

Purpose: The study purpose was to 1) conduct a health needs assessment on safe internet use among youth during the COVID-19 pandemic in Amilo Village, Kenya, and 2) develop a public health logic model for an AVFP program to address these needs.

Methods: A health infographic summarized a health needs assessment of internet use trends among children in Kenya and discussed interventions on safe internet use. A public health logic model outlined inputs, outputs, and outcomes addressing implementation of a safe internet use program.

Results: Youth are the largest population using the internet in Kenya. They are at an increased risk of mental health outcomes related to internet use, and 20% are accessing inappropriate content while online in Kenya. A program was designed to educate children and parents about the harms associated with internet use and provide them with the skills to navigate the internet safely.

Discussion: Programs educating youth and parents about safe internet use can be implemented as a strategy to prevent mental health outcomes and inappropriate internet use among youth.

Title: A Health Needs Assessment and Logic Model Framework to Address COVID-19 Personal Hygiene and Safety in Amilo Village, Kenya

Students: Nicholas Stulb, Felycitie Lindsay, Erica Kleppinger, Brittany Schleicher

Advisor: Dr. Colleen Payton

Location: PPHAC Atrium

Introduction: The Alice Visionary Foundation Project is a U.S. non-profit and Kenyan non-governmental organization focused on the empowerment of disadvantaged persons through education, poverty reduction, and gender equality.

Purpose: The purpose of this study was to 1) conduct a health needs assessment on COVID-19 personal hygiene and safety concerns in Amilo Village, Kenya, and 2) develop a public health logic model for a program to address these needs.

Methods: A health needs assessment was conducted that described the need for a personal hygiene and safety program during the COVID-19 pandemic in Amilo Village, Kenya. A health infographic was created to highlight the major points. A public health logic model was developed to outline a program to address those needs, including inputs, outputs, and outcomes.

Results: A program was designed utilizing evidence-based practice to determine how effective mask wearing, increased access to water, sanitation, and hygiene (WASH) facilities, and safe spaces away from home could lead to improved health and safety for young girls.

Discussion: Implementation of this educational program that teaches proper sanitation, hygiene practices, and safe spaces could reduce COVID-19 transmission and empower young women.

Title: A Study of Photochromic Lenses

Students: Juliana Haddad

Advisor: Dr. Kelly Kriebel

Location: PPHAC Atrium

We describe here a study of commercially available photochromic lenses. The dynamic properties of these lenses are examined as a function of the time required for the lenses to either darken or fade as they are subjected to an ultraviolet laser (simulating sunlight). The characteristic transition times (similar to a half-life) are measured for lenses from different manufacturers as a function of lens color and applied temperature. Results indicate a strong temperature dependence, as well as differences in fading and darkening rates for various lens transition colors.

Title: Do Grasses Promote Shrub Expansion into Grasslands on Barrier Islands?

Students: Alya Wezza

Advisor: Dr. Natasha Woods

Location: PPHAC Atrium

*Barrier islands buffer the US mainland from storms and yet, they are vulnerable to environmental perturbations caused by climate change. *Morella cerifera*, a native shrub, is expanding into grasslands on Virginia Barrier Islands. This expansion into grasslands could lead to the fragmentation of barrier islands. Reasons for this expansion include higher mean winter temperatures and potentially facilitation by grasses. The current greenhouse study set out to examine the impact of increasing grass density (low, medium, high) on the growth of *M. cerifera* seedlings (n=15 per treatment). The proxies used for growth were seedling height and biomass. The final average height of plants in the low, medium, and high treatment groups were 20.2g (+/- 2.2g), 15.8g (2.2+/-g), and 18.2g (+/-4.3g), respectively. The final average biomass of plants in the low, medium, and high treatment groups were 1.90g (+/-0.411g), 0.716g (+/-0.85g), and 1.12g (+/-0.576g), respectively. There does not appear to be a significant impact of grass density on early seedling establishment, even though the low treatment group had the greatest height gain and the greatest biomass. Future experiments should examine any potential interaction between grass density and temperature.*

Title: Perk up your Ears; High Salinity Decreases Corn Yields

Students: Avery Korner

Advisor: Dr. Natasha Woods

Location: PPHAC Atrium

*Climate change, specifically sea level rise, is having an adverse impact on farmlands along the mid-Atlantic Coast. Most crops cannot tolerate salinities above 2 ppt, but many farmers are testing crops to determine their salt tolerance. Corn (*Zea mays*) is a staple crop that is grown in these vulnerable areas. The current experiment examines the impact of increasing salinity (i.e., 0 ppt, 2 ppt, 5 ppt, 10 ppt, and 20 ppt) on the growth of seven-week-old corn seedlings. Each treatment group had five replicates. The response variables were height growth and dry biomass. The results show that increasing salinity decreased the height growth of seedlings and corn seedlings were able to persist at a salinity of 5 ppt for 7 weeks. This suggests that corn may be more resilient to salinity. While corn was able to persist for up to 5 ppt salinity, it is unknown if this crop will be able to persist long enough to produce ears of corn, as their dry biomass was significantly less than the 0 ppt and 2 ppt replicates. Additional crops should be examined so that more salt-tolerant crops are able to be grown in coastal farms.*

Title: Hot Off The Press: Sea Level Rise Decreases the Yield of Chiltepin Peppers

Students: Emily Buonocore

Advisor: Dr. Natasha Woods

Location: PPHAC Atrium

*The Chiltepin pepper (*Capsicum annum*) is the only wild native chili pepper in the U.S. It is currently cultivated in farms along the Mid-Atlantic coast. Studies suggest that crop yields decline at salinity levels as low as 2 ppt. If the Chiltepin pepper is going to persist in agricultural farms along the Mid-Atlantic coast, its salinity tolerance needs to be examined. The seedling stage of development is the most vulnerable for a plant. In the current experiment, four week old seedlings were exposed to 0, 2, 5, 10, and 20 ppt salinity treatments over the course of seven weeks. Each treatment had five replicates and their height growth was recorded weekly. For each treatment group the average final height and biomass were analyzed. At higher salinity levels (10 and 20 ppt) the height growth of Chiltepin pepper seedlings were significantly less than those that grew at lower salinity levels (0, 2, 5 ppt). Other results show that the 0, 2, 5 ppt treatments groups contained significantly greater biomass than the 20 ppt. As sea level rise accelerates, the population of the cultivated Chiltepin peppers become more vulnerable to salt intrusion.*

Title: The Fungi of Camaquiri and Their Importance

Students: Connor Zamora

Advisor: Dr. Daniel Proud

Location: PPHAC Atrium

Last month, during a study abroad trip we took a trip to a field station in Limón province, Costa Rica. This field station is called Camaquiri, and I decided to do the first observations regarding the fungi that inhabit the area. Upon identifying each organism, I separated them by their roles within the ecosystem. Each one of those roles has a function in the ecosystem that should be considered just as important as the animal and plant kingdoms around them. Saprophytic species help recycle nutrients into the nutrient-poor soils. Mycorrhizal species help plants share nutrients, as well as acting as an extension of their root systems. Parasitic species, although preying upon plants in the ecosystem, help to weed out the less healthy plants that may weaken an ecosystem. These fungi work in tandem with each other to help keep the ecosystem alive, and should be considered just as important as the other kingdoms.

Title: Stable Marriage Problem

Students: Garrison Koch, Victoria Samuels, Victoria Harper, John Riley

Advisor: Dr. Nathan Shank

Location: PPHAC Atrium

Stable Marriages in a population are locating a stable matching between two uniform groups of people that have identified a ranking of their preferences of each person in the opposite group. Our goal is to research different instability between the two groups. Continuing the Gale-Shapley Algorithm, and finding new characteristics and applications of the problem; looking into the college application process.

Title: DNA and BSA Binding Kinetics of Dirhodium Tetrabutyrate

Students: Julie Dinh

Advisor: Dr. Shari Dunham

Location: PPHAC Atrium

Select dirhodium compounds have been studied as chemotherapeutic agents. One of these compounds that was found to be toxic to cancer cells is dirhodium tetrabutyrate, but recent literature has limited reports of its biological activity. We studied the binding kinetics of dirhodium tetrabutyrate to salmon testes DNA and to bovine serum albumin (BSA) and compared it to the well-studied compound dirhodium tetraacetate. Binding reactions were carried out at 37°C in 5 mM phosphate buffer, 15 mM NaCl at pH 6.8. Timepoints were analyzed for DNA or protein concentration using UV-Visible spectroscopy and for rhodium content using atomic absorption spectroscopy. Rates of binding by the two rhodium compounds will be compared for different biomolecules and discussed in the context of their potential anticancer activity.

Title: The Use of a Macrophage Infection Model to Determine the Effect of Antioxidant Seleno-L-Methionine on Levels of Phagocytosis

Students: Brooke Coonrod

Advisor: Dr. Kara Mosovsky

Location: PPHAC Atrium

Burkholderia pseudomallei is a gram negative soil dwelling bacteria that is the causative agent of melioidosis, an infectious disease native to Southeast Asia and Northern Australia. B. pseudomallei has evolved to become resistant to many antibiotics, and the current treatments involve an inaccessible, long and expensive process. This bacteria is known to thrive and replicate in the intracellular environment of white blood cells, making it difficult to target with antibiotics alone. Recent research has shown that the dietary antioxidant,

Seleno-L-methionine (SeMet) reduced both the intracellular and extracellular bacterial burden, to a level comparable to an antibiotic, but this interaction is not completely understood. The goal of this project was to determine if SeMet treatment increases uptake (phagocytosis) and subsequent killing of the intracellular bacteria. We used Burkholderia thailandensis as a safe model organism in place of B. pseudomallei. We studied uptake of both bacteria and fluorescent beads, added either simultaneously with treatment or after a pre-treatment period. We found that the timing of the SeMet treatment relative to the bacteria/bead addition had a direct effect on phagocytosis. This result helps to explain why we were seeing a decreased bacterial burden inside macrophages treated simultaneously with SeMet.

Title: Past and Present Species Distribution Models for Vonones sayi and Vonones ornatus

Students: Sam Does

Advisor: Drs. Daniel Proud and Shahan Derkarabetian

Location: PPHAC Atrium

The harvestman family Cosmetidae occurs throughout South America to the eastern USA. The cosmetid genus Vonones contains two species (V. sayi and V. ornatus) distributed in the Southeastern United States. Species Distribution Modeling was used to predict which environmental variables may be influencing the distribution of these two species and to use that data to construct present-day distribution maps. Using the dismo package in R, I utilized MaxEnt to construct maps under three climatic scenarios: present-day, Mid-Holocene (~6,000 years ago), and Last Glacial Maximum (LGM, ~21,000 years ago). Occurrence data used in the analysis was sourced from iNaturalist. Data provided by both WordClim and ENVIREM were used to create the environmental predictors. Our distribution maps indicate that V. ornatus and V. sayi have very little overlap in their ranges. Our model also suggests that these two species utilized different refugia during the LGM. The next goal of this project will be to measure and describe the amount of variation in the dorsal color patterns.

Title: Disappearing Act: Crops May Not Grow In Coastal Farms Due To Sea Level Rise

Students: Brittany Gomez

Advisor: Dr. Natasha Woods

Location: PPHAC Atrium

Corn (Zea Mays) is one of the most widely grown crops in the US and is important in the US economy. It is primarily used for human food, beverages, feed grain for beef cattle, and as a biofuel. However, its cultivation in mid Atlantic coastal areas may be diminishing due to sea level rise. Farmlands are being frequently inundated with saltwater, adversely affecting agricultural lands. The current experiment was performed to examine the salt tolerance of corn during the germination stage of development and subsequent establishment. Seeds were treated with 0, 2, 5, 10, and 20 ppt salinity. There were five replicates of each treatment and treatments were given every two days. After seedlings emerged, they were measured once every two weeks. The germination results show that corn seeds cannot germinate at a salinity of 20 ppt. The seedling results show that height growth was adversely impacted by salinity starting at 10 ppt ($p < 0.01$) and biomass was negatively impacted by salinity levels as low as 2 ppt ($p < 0.05$). Typical crops may disappear from mid Atlantic coastal farms when crops fail to germinate or experience low yield in high salinity soils.

Title: Synthesis and Characterization of Dirhodium Compounds with Folic, Butyric, and Carbohydrate Acids

Students: Elliott Guido

Advisor: Drs. Stephen Dunham and Anastasia Thévenin

Location: PPHAC Atrium

A common treatment for cancer is chemotherapy, and while it does kill cancer cells it often can not distinguish between a healthy cell and the cancer cell. Metal-based compounds have already shown to exhibit chemotherapeutic properties, with cisplatin being the most successful currently being used today. Rhodium in

the form of dirhodium tetracetate or dirhodium tetrabutyrates have already proven to show cytotoxic effects in cancer cells. However, Rh2A4 has been shown to not be as effective as cisplatin and while Rh2B4 is more toxic, it is not very soluble. The goal of this project was to synthesize Rh2A4 and Rh2B4 based drugs to increase targeting potential towards cancer cells and solubility in aqueous solution. Folic acid and carbohydrates were chosen to coordinate to the rhodium compounds because it is believed that in most cancer cells, the uptake of glucose and folic acid into the cell is increased due to the over expression of Glucose transport proteins (GLUTs) and folic acid receptors. By coordinating a carbohydrate or folic acid molecule on the cancer-killing dirhodium agent, we hope it will preferentially target and kill these high glucose/folic acid-craving cells and leave normal cells alone. Carbohydrates also provide the molecule with many hydrogen bond donors and acceptors and can be used to increase water solubility. Three new dirhodium complexes were synthesized, purified, characterized, and tested in HeLa cells in order to determine cytotoxicity.

Undergraduate Student Conference Presentations

BIOLOGICAL SCIENCES

Fabiana Popolla. *Shelter Competition in Grass Shrimp.* Poster Presentation at Benthic Ecology Meeting, March 2022, Portsmouth, NH.

Faculty advisor: Dr. Joshua Lord

Samantha Flickinger. *Predator-Prey Interaction Between Grass Shrimp and Mummichog Fish.* Poster Presentation at Benthic Ecology Meeting, March 2022, Portsmouth, NH.

Faculty advisor: Dr. Joshua Lord

Anthony DiSipio Jr. *Environmental Effects on Group Dynamics in Shrimp.* Oral Presentation at Benthic Ecology Meeting, March 2022, Portsmouth, NH.

Faculty advisor: Dr. Joshua Lord

Eliza Grigsby. *Do Selenium Antioxidants Affect the Mechanism of Bacterial-Induced Macrophage Death?* Oral Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.

Faculty advisor: Dr. Kara Mosovsky

Eliza Grigsby. *Do Selenium Antioxidants Affect the Mechanism of Bacterial-Induced Macrophage Death?* Poster Presentation at the Beta Beta Beta Biology Honor Society Centennial Northeast-2 District Convention, April 2022, PA.

Faculty advisor: Dr. Kara Mosovsky

Nadea Dundore. *Do Selenium Antioxidants Aid in Bacterial Killing in a Macrophage Infection Model?* Poster Presentation at the Annual Biomedical Research Conference for Minority Students, November, 2021, Virtual.

Faculty advisor: Dr. Kara Mosovsky

Nadea Dundore. *Do Selenium Antioxidants Aid in Bacterial Killing in a Macrophage Infection Model?* Poster Presentation at the Beta Beta Beta Biology Honor Society Centennial Northeast-2 District Convention, April 2022, PA.

Faculty advisor: Dr. Kara Mosovsky

Brooke Coonrod. *The Use of a Macrophage Infection Model to Determine the Effect of Antioxidant Seleno-L-Methionine on Levels of Phagocytosis.* Poster Presentation at the Lehigh Valley Molecular and Cell Biology Symposium, April 2022, PA.

Faculty advisor: Dr. Kara Mosovsky

Mikayla Dennis. *Pretreatment of Curcumin and Vitamin E as a Protective Measure in the 6-Hydroxydopamine Model of Parkinson's Disease.* Poster Presentation the Beta Beta Beta Biology Honor Society Centennial Northeast-2 District Convention, April 2022, PA.

Faculty Advisor: Dr. Cecilia Fox

Mikayla Dennis. *Pretreatment of Curcumin and Vitamin E as a Protective Measure in the 6-Hydroxydopamine Model of Parkinson's Disease.* Poster Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.

Faculty Advisor: Dr. Cecilia Fox

Mikayla Dennis. *Pretreatment of Curcumin and Vitamin E as a Protective Measure in the 6-Hydroxydopamine Model of Parkinson's Disease.* Oral Presentation at the Lehigh Valley Society for Neuroscience Conference, April 2022, Virtual.

Faculty Advisor: Dr. Cecilia Fox

Zachary Filliben. *The Role of Capsaicin in the Restoration of Dopamine Neurons Following 6-Hydroxydopamine Neurotoxicity.* Oral Presentation at the Lehigh Valley Society for Neuroscience Conference, April 2022, Virtual.

Faculty Advisor: Dr. Cecilia Fox

Damian Wasieczko. *The Protective Potential of Capsaicin in the 6-Hydroxydopamine Rodent Model of Parkinson's Disease.* Poster Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.

Faculty Advisor: Dr. Cecilia Fox

Damian Wasieczko. *The Protective Potential of Capsaicin in the 6-Hydroxydopamine Rodent Model of Parkinson's Disease.* Poster Presentation at the Faculty for Undergraduate Neuroscience Conference, April 2022, Virtual.

Faculty Advisor: Dr. Cecilia Fox

Damian Wasieczko. *The Protective Potential of Capsaicin in the 6-Hydroxydopamine Rodent Model of Parkinson's Disease.* Oral Presentation at the Lehigh Valley Society for Neuroscience Conference, April 2022, Virtual.

Faculty Advisor: Dr. Cecilia Fox

Samuel Does. *Behavioral Effects of Paired Versus Solitary Display on Captive North American River Otters.* Poster Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.

Faculty Advisor: Dr. Sara McClelland

Samuel Does. *Past and Present Species Distribution Models for *Vonones sayi* and *Vonones ornatus* (Arachnida: Opiliones: Cosmetidae).* Poster Presentation at the Lehigh Valley Ecology & Evolution Symposium, April 2022, Virtual.

Faculty Advisor: Dr. Daniel Proud

Yzatis Nieves. *Learning From Nature: Using Play to Learn in a College Zoology Course.* Poster Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.
Faculty advisor: Dr. Sara McClelland

Luana Rebello. *Is the Germination of Morella cerifera Facilitated by Grasses on Hog Island, VA?* Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.
Faculty advisor: Dr. Natasha Woods

Rim Turk *Role of Gap Junction Phosphorylation by MAP Kinases in Src Recruitment from Cancer Cells.* Poster presented at the 6th Annual Symposium of the Lehigh Valley Molecular and Cellular Biology Symposium, April 6, 2022. Allentown, PA.
Faculty advisor: Dr. Anastasia Thévenin

Rim Turk *Role of Gap Junction Phosphorylation by MAP Kinases in Src Recruitment from Cancer Cells.* Poster presented at the Moravian University Honors Poster Exhibit, March 10, 2022. Bethlehem, PA.
Faculty advisor: Dr. Anastasia Thévenin

Rim Turk *Role of Gap Junction Phosphorylation by MAP Kinases in Src Recruitment from Cancer Cells.* Virtual oral presentation Moravian University Beta Beta Beta Chapter meeting, November 18, 2022. Bethlehem, PA.
Faculty advisor: Dr. Anastasia Thévenin

Liz Perez *Regulation of Src and Cx43 Interaction in Mammalian Cells by MAPKs.* Poster presented at the 6th Annual Symposium of the Lehigh Valley Molecular and Cellular Biology Symposium, April 6, 2022. Allentown, PA.
Faculty advisor: Dr. Anastasia Thévenin

Liz Perez *Regulation of Src and Cx43 Interaction in Mammalian Cells by MAPKs.* Poster presented at the Moravian University Honors Poster Exhibit, March 10, 2022. Bethlehem, PA.
Faculty advisor: Dr. Anastasia Thévenin

Liz Perez *Regulation of Src and Cx43 Interaction in Mammalian Cells by MAPKs.* Virtual oral presentation Moravian University Beta Beta Beta Chapter meeting, November 18, 2022. Bethlehem, PA.
Faculty advisor: Dr. Anastasia Thévenin

Rachel Riley *Synergistic Inhibition of Src Activity in Prostate Cancer Cells by Connexin 43 and PTEN Proteins.* Poster presented at the 6th Annual Symposium of the Lehigh Valley Molecular and Cellular Biology Symposium, April 6, 2022. Allentown, PA.
Faculty advisor: Dr. Anastasia Thévenin

Rachel Riley *Synergistic Inhibition of Src Activity in Prostate Cancer Cells by Connexin 43 and PTEN Proteins*. Oral presentation at virtual Moravian University Beta Beta Beta chapter meeting , October 10, 2021. Bethlehem, PA.

Faculty advisor: Dr. Anastasia Thévenin

CHEMISTRY

Charlotte Reid. *Cellular Targets of Novel Dirhodium Complexes*. Presentation at the National Conference on Undergraduate Research, April 2022, Virtual.

Faculty advisors: Drs. Shari Dunham & Anastasia Thévenin

COMPUTER SCIENCE

Jacob Smith. *Tool to Teach and Practice the GitHub Workflow*. Poster Presentation at Consortium for Computing Sciences in Colleges, October 2021, Arlington, VA.

Faculty advisor: Dr. Ben Coleman

MATHEMATICS

Garrison Koch, Evan Sabini (Villanova University). *Assignment Graphs Generated From Digraphs*. Poster presented at Northeast Combinatorics Network KATCH Conference, August 2021, Virtual

Faculty advisor: Dr. Nathan Shank

Garrison Koch. *The Bipartite Graph Reduction Game*. Poster presented at Joint Mathematics Meeting, April 2022, Virtual.

Faculty advisor: Dr. Nathan Shank

Garrison Koch, Kayla Barker (Stockton University). *On the Solvability of a Bipartite Graph Reduction Game*. Presentation at the EPaDel Mathematics Conference, November 2021, Virtual

Faculty advisor: Dr. Nathan Shank

Garrison Koch, Kayla Barker (Stockton University). *A Bipartite Graph Reduction Game*.

Presentation at the Moravian University Undergraduate Mathematics Conference, February 2022, Virtual.

Faculty Advisor: Dr. Nathan Shank

Emma Miller. *On the Characterization of Rank 6 Graphs with Triangles*. Presentation at Joint Mathematics Meeting, April 2022, Virtual.

Faculty advisor: RIT REU Program

Emma Miller. *Considering Quantum Games*. Presentation at the Moravian University Undergraduate Mathematics Conference, February 2022, Virtual.

Faculty Advisor: Dr. Michael Fraboni

MORAVIAN UNDERGRADUATE CONFERENCE IN MEDIEVAL AND EARLY MODERN STUDIES

Andrew Hozza. *Ariel: The Master of Magic.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. John Black

Ciro Cavaliere. *Irene of Athens.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

Ethen Aquino. *Joan of Arc.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

Morgan Colver and Sean Cavaliere. *Isabella of Castile.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

Gianna Tully. *Caliban's Physical and Ethical Humanity.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. John Black

Griffin LeBlond. *Prospero: Villainous Monster or Caring Father?.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: John Black

Iris Isbansky. *Ecocritical Perspectives on The Tempest.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. John Black

Dylan Zukawski. *An Analysis of The Tempest.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. John Black

Amanda Whitworth. *Heloise.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

Abbey Richerson. *Catherine of Siena.* Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

Sabrina Moody. *Gráinne Ní Mháille*. Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

Bard Bardelli and Nicholas Bergsma. *Christina of Sweden*. Presentation at 15th Moravian Undergraduate Conference in Medieval and Early Modern Studies, December 2021.

Faculty advisor: Dr. Sandy Bardsley

PSYCHOLOGY

Kiana Faroun and Rose Marie Long. *Friendship and Romantic Attachment as Predictors of Loneliness and Life Satisfaction in Adulthood*. Presentation at the Eastern Psychological Association Conference, March 2022, NYC, NY.

Faculty Advisor: Dr. Michelle Schmidt

Kaitlin Kridlo. *The Effect of a Brief Mindfulness Meditation Induction Before Encoding on False and True Memory in the DRM Paradigm*. Poster presentation at the National Conference on Undergraduate Research, April 2022, virtual.

Faculty advisor: Dr. Sarah Johnson

Lauren Kubic. *Interpersonal and Intrapersonal Emotion Regulation Efficacy: The Role of Interpersonal Trust and Anxiety*. Poster Presentation at Association for Psychological Science, May 2021, virtual convention.

Faculty advisor: Dr. Aleena Hay

Sean McFarland. *Digital Interpersonal Emotion Regulation and In-Person Interpersonal Emotion Regulation: The Role of Anxiety, Depression, and Stress*. Poster Presentation at Association for Psychological Science, May 2021, virtual convention.

Faculty advisor: Dr. Aleena Hay

PUBLIC HEALTH

Liam Romond and Micaela Posh. *Poverty simulation as interdisciplinary health workforce development*. Poster presentation at the Society for Public Health Education 73rd Annual Conference, March 2022, virtual.

Faculty advisor: Dr. Colleen Payton

Felciticie Lindsay. *Interviews with community stakeholders who work with immigrants and refugees in Lehigh Valley, Pennsylvania*. Poster presentation at the National Conference on Undergraduate Research, April 2022, virtual.

Faculty advisor: Dr. Colleen Payton

Nicholas Stulb and Emily Shingara. *A review of the APHA policy statements related to the health of migrant, immigrant, refugee, and displaced populations, 1970-2020.* Poster presentation at the 2022 Pennsylvania Community and Public Health Conference, June 2022, State College, PA.

Faculty advisor: Dr. Colleen Payton

There is still time to see the Senior Thesis Exhibition in the Payne Gallery. The exhibition opens on April 21st (4-6pm). Students will be exhibiting their year-long research projects. See below for student presenters.

STUDIO ART

Lauren Dorney. *Nostalgia: Where Art Meets Psychology (March 30th) Timeless: where art meets psychology and television (April 21st) Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Angela Fraleigh

Javier Espinial-Katz: *Notion of Home (March 16th) For whom the Bell tolls (April 21st) Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Angela Fraleigh

Lauren Haffling. *Fringe and Fibers: Sculptural painting for Interior Design (February 24th) Drift (April 21st) Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Angela Fraleigh

Edward Krejsa. *Perspective: the Kresja Art Experience (April 11th) The Meaning of Perspective (April 21st) Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Angela Fraleigh

Olivia Lucas. *Impermanence: a philosophical exploration through grief (March 23rd) and Afterlife: A painting installation exploring Mortality and Immortality (April 21st). Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Angela Fraleigh

Alexis Wellech-Papillon. *PYNK: A study into the cultural implications of pink (March 9th) Here To Stay: LGBTQ2+ fashion (April 21st) Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Angela Fraleigh

GRAPHIC & INTERACTIVE DESIGN

Reem Alkhalidi. *Try Me. Cosmetic Branding. Project link: <https://reemalkhalidi.com> (April 21st) Payne Gallery, Moravian University, Bethlehem, PA*

Faculty advisor: Camille Murphy

Francesca Bartolucci. *The Root.* The Root is a mobile application designed to increase consumer awareness by encouraging a transparent relationship between the producer and the consumer. Project link: <https://francescalee.co> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Miranda Calabrese. *Rando Prints!* Branding and design for her own student-owned screen-printed apparel company. Project link: <https://mirandacalabrese.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Cordell Corlette. *Attention to Detailing.* Re-brand and website design/development for his own student-owned car detailing company. Project link: <https://www.attentiontodetailinglv.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Oliva Esposito. *AIM Health.* AIM Health is a mobile application that aims to help users identify injuries and direct them to health resources. Project link: <https://oliviamesposito.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Julian Hartshorne. *Tech Roots.* Mobile application branding and design. Project link: <https://julianhartshorne.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Alyssa Lambert. *Modificase.* Design and marketing for original biodegradable, clear phone cases that are sold with a variety of paper designs. Project link: <https://alyssalambert.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Anna Litofsky. *IntroVert.* The IntroVert App is an original mobile application for finding friends in college with introverts in mind. Project link: <http://www.annalitofsky.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Camille Stanley. *Radical.* Skateboard branding and design. (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Amanda Wagner. *Homify.* Homify is a mobile application that focuses on interior design. Project link: <https://amandajeandesigns.com> (April 21st) *Payne Gallery, Moravian University, Bethlehem, PA*
Faculty advisor: Camille Murphy

Honors 2021-2022

Spring 2021-Fall 2021 (Projects completed)

Hannah Katz	Political Science
Johanna Pearson	Music
Emily Saulino	Chemistry and Biology

Fall 2021-Spring 2022 (Projects will be completed by the end of Spring 2022)

Mikayla Dennis	Neuroscience
Nadea Dundore	Biology
Kaitlyn Furst	Music
Eliza Grigsby	Biology
Elliott Guido	Biochemistry
Danielle Hanson	Philosophy
Emma Miller	Mathematics
Liz Perez	Biochemistry
Charlotte Reid	Biochemistry
Rachel Riley	Biochemistry
Rim Turk	Biochemistry
Damian Wasieczko	Neuroscience

SOAR Projects 2021-2022

Was the French Revolution a Religious Revolution? Maximilien Robespierre and the Cult of the Supreme Being

Tyler Clemente

Faculty Advisor: Dr. Heikki Lempa

Effects of Organophosphates on Vertebrate Behavior and Neurodevelopment

Delanie Crabtree

Faculty Advisor: Dr. Sara McClelland

Environmental Effects on Group Dynamics in Shrimp

Anthony DiSipio

Faculty Advisor: Dr. Joshua Lord

Do Selenium Antioxidants Aid in Bacterial Killing in a Macrophage Infection Model?

Nadea Dundore

Faculty Advisor: Dr. Kara Mosovsky

Do Selenium Antioxidants Affect the Mechanism of Bacterial-Induced Macrophage Death?

Eliza Grigsby

Faculty Advisor: Dr. Kara Mosovsky

Characterization of Photochromic Lenses

Juliana Haddad

Faculty Advisor: Dr. Kelly Kriebel

From Buddhism to Kierkegaard: How Philosophy Can Help Us Cope with Anxiety

Danielle Hanson

Faculty Advisor: Dr. Carol Moeller

Impartial Combinatorial Games on $n \times n$ Lattice and Addressing Graphs

Garrison Koch

Faculty Advisor: Dr. Nathan Shank

In coordination with the National Science Foundation Research Experience for Undergraduates (NSF-REU) Site grant: Research Challenges of Computational and Experimental Mathematics

Interviews with Community Stakeholders Who Work with Immigrants and Refugees in Lehigh Valley, Pennsylvania

Felycitie Lindsay

Faculty Advisor: Dr. Colleen Payton

Bioanalytical Methods to Screen Interactions of a 34-mer DNA Duplex with Rhodium

Mitchell Melnick

Faculty Advisor: Dr. Shari Dunham

Moravian Music: Creating Performance Editions from the Archives

Rose Michetti

Faculty Advisor: Dr. Hilde Binford

Assisted by Gwyneth A. Michel, Assistant Director, and David Blum, Research Librarian,
Moravian Music Foundation

Evaluating the Effectiveness of Pesticide Removal Methods Using Liquid Chromatography-Mass Spectrometry

Chad Propst

Faculty Advisor: Dr. Alison Holliday

Synthesizing Rhodium-Maleimide-Glucose Complexes to Increase Solubility

Emily Saulino

Faculty Advisor: Dr. Stephen Dunham

Properties of Brooker's Merocyanine, a Solyatochromic Compound

Rebecca Skibo

Faculty Advisor: Dr. Carl Salter

Queer and Trans* Youth Lives in the English Classroom

Joel Soto

Faculty Advisor: Dr. Bess Van Asselt