



MORAVIAN COLLEGE

The 16th Annual Student Scholarship and Creative Endeavors Day

April 20, 2021

This year, 62 students, representing 13 different areas of study, are participating in the 2021 Scholars Day presentations. Congratulations to these student scholars for all of their accomplishments, and many thanks to their 24 faculty sponsors. Since the inception of this event 16 years ago, 1034 students have shared their scholarly accomplishments with the Moravian College community. We also wish to acknowledge funding to student research through the Rokke Endowment for Student Research and the SOAR program.

Scholars Day is being held online this year, using both Canvas and Zoom. We invite you to use the Canvas shell to explore posters and to follow the Zoom links to view oral presentations and live poster sessions. Our thanks to Liz Tate and her team in IT for their help in problem-solving with us how to make it happen!

The 16th Annual Moravian College Undergraduate Student Scholarship and Creative Endeavors Day April 20, 2021

Schedule

8:00 a.m.	Welcome and Opening Remarks
8:05 a.m. – 9:00 a.m.	<u>Session I: Oral Presentations Abstracts</u>
9:40 a.m. – 10:55 a.m.	<u>Session II: Oral Presentations Abstracts</u>
11:20 a.m. – 12:15 p.m.	<u>Session III: Oral Presentations Abstracts</u>
12:00 p.m. – 1:00 p.m.	<u>Student Poster Presentations I Abstracts</u>
1:00 p.m. – 2:15 p.m.	<u>Session IV: Oral Presentations Abstracts</u>
2:40 p.m. – 3:50 p.m.	<u>Session V: Oral Presentations Abstracts</u>
4:00 p.m. – 5:00 p.m.	<u>Student Poster Presentations II Abstracts</u>
4:20pm -	Art Senior Thesis Virtual Talks (see flyer in this program for details!)

ALL Oral Presentations: [Zoom Link](https://moravian.zoom.us/j/92008780566) (https://moravian.zoom.us/j/92008780566)

Posters Sessions I: [Zoom Link](https://moravian.zoom.us/j/96981309347) (https://moravian.zoom.us/j/96981309347)

Poster Session II: [Zoom Link](https://moravian.zoom.us/j/99603149216) (https://moravian.zoom.us/j/99603149216)

SESSION I: Oral Presentations

Oral Presentations			
Session I: Moderator - Dr. Cecilia Fox (Biological Sciences, Neuroscience)			
ZOOM LINK			
8:05 AM	Charlotte Reid	Biochemistry	Drs. Anastasia Thévenin & Shari Dunham
<i>HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes</i>			
8:25 AM	Victoria Vargas, Sonal Arora	Biochemistry	Dr. Anastasia Thévenin
<i>Does the Phosphorylation by MAP-Kinases Impact the Tumor-Suppressive Function of Gap Junctions?</i>			
8:45 AM	Raquel Lopez de Boer	Neuroscience	Dr. Cecilia Fox
<i>Protective Effects of Curcumin on the Production and Metabolism of Dopamine in the 6-Hydroxydopamine Model of Parkinson's Disease: An Interdisciplinary Study</i>			

SESSION II: Oral Presentations

Oral Presentations			
Session II: Moderator -Dr. Crystal Fodrey (English)			
ZOOM LINK			
9:40 AM	Ryan Scott	English	Meg Mikovits
<i>Towards a Measure of Conceptual Change: Understanding How First Year Writing Complicates Students' Prior Knowledge about Writing</i>			
10:00 AM	Natalie Slayton	Global Religions	Dr. Jason Radine
<i>Jewish Holocaust Theology</i>			
10:20 AM	Camaryn Wheeler	English	Dr. Crystal Fodrey
<i>Diverse Female Voices in Feminist Revisionist Fairy Tales</i>			
10:40 PM	Chloe Mondok	Neuroscience	Dr. Cecilia Fox
<i>The Neuroprotective Effects of Curcumin and Vitamin E in a 6-Hydroxydopamine Rat Model of Parkinson's Disease</i>			

SESSION III: Oral Presentations

Oral Presentations			
Session III: Moderator - Dr. Kara Mosovsky (Biological Sciences)			
ZOOM LINK			
11:20 AM	Emma Miller	Mathematics	Dr. Nathan Shank
	<i>Clumsy Packing of Polyominoes</i>		
11:40 AM	Alec Buttner	Biochemistry	Dr. Anastasia Thévenin
	<i>The Connexin 43 Carboxyl-Terminus Tail as a Src Inhibitor in Cancer Cells</i>		
12:00 PM	Riley McHugh	Neuroscience	Dr. Cecilia Fox
	<i>The Neuroprotective Effects of Capsaicin in the 6-Hydroxydopamine Model of Parkinson's Disease</i>		

SESSION IV: Oral Presentations

Oral Presentations			
Session IV: Moderator - Dr. Alison Holliday (Chemistry)			
ZOOM LINK			
1:00 PM	Cassandra Hoffmann	Art	Natessa Amin
	<i>Securely Insecure</i>		
1:20 PM	Melissa R. Strom	Art	Dr. Kristin Baxter & Susan Morelock
	<i>The Role of Cognitive-Behavioral Therapy Strategies in Promoting Effective Communication and Confidence in Artists</i>		
1:40 PM	Morgan Weaver	Biological Sciences	Dr. Josh Lord
	<i>The Effect of Ocean Acidification on Dominance Hierarchy Formation in Pagurus longicarpus</i>		
2:00 PM	Elizabeth Jones	Chemistry	Dr. Michael Bertucci
	<i>Investigating pH Dependency of LamD Cyclization</i>		

SESSION V: Oral Presentations

Oral Presentations			
Session V: Moderator - Dr. Sandy Bardsley (History)			
ZOOM LINK			
2:40 PM	Colby Robertson	History	Dr. Heikki Lempa
	<i>Ballet or Court Dance? Exploring the Foundations of the Classical Ballet in the Court of Louis XIV, 1650-1700</i>		
3:00 PM	Caitlin Roth	Sociology	Dr. Adams O' Connell
	<i>Sex Role Socialization in Childhood in Relation to Its Impact on Future Career Choices</i>		
3:20 PM	Salma Ibrahim, Gabriel Crouthamel, Sarah Ryan, Audrey Templeton, Amber Capurso	History	Dr. Sandy Bardsley
	<i>The Material Middle Ages</i>		

POSTER SESSION I

12:00 PM - 1:00 PM Poster Presentations I ZOOM LINK		
Students		Advisor
Rachel Moser <i>Dominance Hierarchies in Freshwater Shrimp</i>	Biological Sciences	Dr. Josh Lord
Lauren Kubic <i>Interpersonal and Intrapersonal Emotion Regulation Efficacy: The Role of Interpersonal Trust and Anxiety</i>	Psychology	Dr. Aleena Hay
Garrison Koch, Saleh Abdussalam, Rey Anaya <i>Dots and Lines Reworked</i>	Mathematics	Dr. Nathan Shank
Kayla Valle, Jean-Pierre Appel, Kyle Adams, Aidan Malloy, Paul Petre <i>Consequences of Additional Parameters in Sudoku</i>	Mathematics	Dr. Nathan Shank
Rosie Long, Hannah Pellicciotti, Kiana Faroun <i>Friendship, Attachment, and Satisfaction with Life in Adulthood</i>	Psychology	Dr. Michelle Schmidt
Frederick Younes <i>Synthesis of dirhodium poly-L-glutamate</i>	Chemistry	Dr. Stephen Dunham
Midelys Franceschini <i>Measuring Color Change as a Non-Invasive Method to Monitor Stress Levels in Amphibians</i>	Biological Sciences	Dr. Sara McClelland
Samuel Rappaport <i>Effects of Predator Cues on Social Hierarchy Formation in the Grass Shrimp <i>Palaemon pugio</i></i>	Biological Sciences	Dr. Josh Lord
Jessica Mickno <i>DNA Binding Interactions of Novel Dirhodium Compounds</i>	Biochemistry	Dr. Shari Dunham
Emilee Engler <i>A Comparative Analysis of Quorum Sensing in Two Pathogens, <i>Bacillus cereus</i> and <i>Streptococcus pneumoniae</i></i>	Chemistry	Dr. Michael Bertucci
Cole Carey <i>Toluene Extraction from Water Using SPME</i>	Chemistry	Dr. Alison Holliday
Trey Adams <i>Graphically Enhanced Augmented Reality's Role in Daily Life</i>	Art	Camille Murphy
Sophia Starner <i>Seleno-L methionine's Effect on <i>Burkholderia thailandensis</i> Infection</i>	Biological Sciences	Dr. Kara Mosovsky
Kasey Hanlon <i>The Use of Macrophage Infection Model to Determine the Effect of Antioxidant Seleno-L-methionine on Phagocytosis and Inflammation</i>	Biological Sciences	Dr. Kara Mosovsky

POSTER SESSION II

4:00 PM - 5:00 PM Poster Presentations II ZOOM LINK		
Students		Advisor
Alexa Hromyak <i>Assessing Nurses' Knowledge of the Care of Clients with Autism Spectrum Disorder Seeking Treatment in the Emergency Department: A Mixed Methods Study</i>	Nursing	Dr. Paulette Dorney
Rachel Riley <i>Inhibition of Src Activity in Human Prostate Cancer Cells upon Expression of Cx43 Gap Junctions</i>	Biochemistry	Dr. Anastasia Thévenin
Elliott Guido <i>Synthesis and Characterization of Glucose Conjugated Rhodium Complexes</i>	Chemistry	Dr. Stephen Dunham
Alec Brisbois <i>Capillary Electrophoresis Identification of Rhodium-DNA Interstrand Cross-linkage</i>	Biochemistry	Drs Shari Dunham & Alison Holliday
Emma Miller, Gabrielle Demchak, Victoria Sami Freeh, Jacob Smith	Mathematics	Dr. Nathan Shank
Sean McFarland <i>Digital Interpersonal Emotion Regulation and In-Person Interpersonal Emotion Regulation: The Role of Anxiety, Depression, and Stress</i>	Psychology	Dr. Aleena Hay
Thomas Mateo <i>Effects of Ocean Acidification on the Foraging Patterns of Atlantic Horseshoe Crabs</i>	Biological Sciences	Dr. Josh Lord
Naomi Rieth <i>Effects of Cyclohexylalanine and Homoleucine Substitutions on CSP1 binding</i>	Biochemistry	Dr. Michael Bertucci
Liz Perez <i>Regulation of Cx43-Src Interaction in Cancer Cells by Mitogen Activated Protein Kinases (MAPKs)</i>	Biochemistry	Dr. Anastasia Thévenin
Melissa Morales <i>Consequences of Ocean Acidification on Marine Snail Foraging Behavior</i>	Biological Sciences	Dr. Josh Lord
Emily Saulino <i>The Synthesis and Characterization of Two Novel Rhodium Compounds</i>	Chemistry	Dr. Stephen Dunham
Daniel Faudree <i>Lumbricus terrestris Genome Assembly</i>	Biological Sciences	Dr. Christopher Jones
Michael Pados <i>Moral Injury: What Role Does Religion Play?</i>	Global Religions	Dr. Kelly Denton-Borhaug

Chad Propst <i>Finding the Detection Limit of a Pesticide Using LC-MS</i>	Chemistry	Dr. Alison Holliday
Janniry Cabrera Belen <i>Pesticide Contamination in Wetlands: Impacts of Pesticides on Anuran Diversity and Abundance</i>	Environmental Science	Dr. Sara McClelland
Tamar Giorgadze <i>Mystery Cults: Cheating Death</i>	Global Religions	Dr. Jason Radine
Nihal Capan <i>Investigating the Effects of Different Washing Techniques on the Pesticide Residue Concentrations of Strawberries</i>	Chemistry	Dr. Alison Holliday
Tyler Geroulo <i>Synthesis and Analysis of a Fluorescent Dirhodium Compound</i>	Biochemistry	Dr. Stephen Dunham
Elizabeth Hutnick <i>Synthesis of Optimized CSPI Derivatives to Modulate Quorum Sensing in S. Pneumoniae</i>	Chemistry	Dr. Michael Bertucci

Student Oral Presentations I

[ZOOM LINK](#)

8:05 – 9:00 AM

Moderator: Dr. Cecilia Fox (Biological Sciences, Neuroscience)

Title: HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes
Students: Charlotte Reid
Advisor: Drs. Anastasia Thévenin & Shari Dunham
Location: [Zoom](#) 8:05 AM - 8:20 AM

Cisplatin is a commonly prescribed cancer treatment with harmful side effects to patients and a propensity for chemotherapeutic resistance. Because of these negative aspects of cisplatin, potential anticancer complexes containing rhodium and their effect on human cervical cancer cells have been studied in our laboratories. These dirhodium complexes contain a variety of bridging carboxylate ligands, including acetate, trifluoroacetate, gluconate, and glucuronate. In our studies of the IC50 values of these compounds, the dirhodium complex with four acetate ligands has been the most cytotoxic. DNA of treated cells was also extracted and analyzed for bound rhodium. We continue to characterize these compounds to understand their mechanisms of action and varying levels of toxicity in cancer cells.

Title: Does the Phosphorylation by MAP-Kinases Impact the Tumor-Suppressive Function of Gap Junctions?
Students: Victoria Vargas, Sonal Arora
Advisor: Dr. Anastasia Thévenin
Location: [Zoom](#) 8:25 AM - 8:40 AM

Gap Junctions (GJ) are cellular structures that allow for direct cell-to-cell communication, coordinating a variety of biological processes including cell homeostasis and differentiation. Transmembrane proteins called connexins (Cx) make up vertebrate gap junctions, with Cx43 being the most expressed isoform. Cx43 is regulated through a series of chemical modification events, known as phosphorylation, by many different enzymes called kinases. Evidence from our laboratory demonstrates that Cx43 interacts and inhibits cell proliferation activity of the proto-oncogenic protein Src in a phosphorylation-specific manner. Src binds to Cx43 within a region that harbors phosphorylation sites regulated by a family of kinases called MAPKs (mitogen-activated protein kinases). Our goal is to create and purify activated MAPKs in bacteria to test their ability to phosphorylate Cx43 at sites (S255, S262, S279, S282) within the Src-binding region. We have successfully produced and purified all three MAPKs (ERK, JNK, and p38) from E. coli bacteria and tested their ability to phosphorylate Cx43 in vitro. Our results demonstrate that ERK and JNK phosphorylate Cx43 to a similar extent at these sites, while p38 has a more limited phosphorylation ability. Understanding these molecular interactions will help determine possible Cx43-based therapies that target Src in tumors.

Title: Protective Effects of Curcumin on the Production and Metabolism of Dopamine in the 6-Hydroxydopamine Model of Parkinson's Disease: An Interdisciplinary Study
Students: Raquel Lopez de Boer
Advisor: Dr. Cecilia Fox
Location: [Zoom](#) 8:45 AM - 9:00 AM

Parkinson's disease (PD) is a neurodegenerative disorder that results from a loss of dopamine neurons in the nigrostriatal pathway due to oxidative stress and chronic inflammatory responses. Therefore, to prevent dopamine neurons from cell death, multiple protective agents have been studied as a preventative therapy. Curcumin is a plant-based polyphenol compound that can be found in the spice, turmeric. It has been seen to have anti-inflammatory and antioxidant potential in other neurodegenerative models, thus gaining interest as a neuroprotective agent for the

treatment of PD. Recently, our lab has identified that intraperitoneal injections of curcumin is capable of protecting dopamine neurons as well as reducing activation of microglia in a 6-hydroxydopamine rodent model of PD. The purpose of this study was to determine the effects of dietary curcumin on the production and metabolism of dopamine in this same animal model. There was significant improvement in motor behavior over time in the foot fault and the rotarod tests when the animals were treated with dietary curcumin for 8 weeks post-lesion. In addition, curcumin treated animals had a higher percentage of dopamine cell survival in the substantia nigra of the nigrostriatal pathway. Liquid chromatography mass spectroscopy was hoped to be used in assessing concentrations of dopamine and its metabolites, DOPAC and HVA. However, the need of an internal standard or LC-MS/MS was imperative too further proceed with quantification.

Student Oral Presentations II

[ZOOM LINK](#)

9:40 – 10:35 AM

Moderator: Dr. Crystal Fodrey (English Department)

Title: Towards a Measure of Conceptual Change: Understanding How First Year Writing Complicates Students' Prior Knowledge about Writing

Students: Ryan Scott
Advisor: Meg Mikovits

Location: [Zoom](#) 9:40 AM - 9:55 AM

Writing studies and education scholars have, in recent years, begun to focus on how individuals form and re-form their conceptions about writing, particularly in ways that help people move from misconceptions or inflexible patterns of thinking and towards more nuanced, contextually-dependent, and metacognitive approaches (Entwistle, 2004; Stone, 2018; Paz, 2019; Stanley, 2020). Students points of interest regarding conceptual change occur when students make the transition from high school to college writing. In a recent project focused on conceptual change among upper-level students, researcher Enrique Paz (2019) found that students' formation of new conceptions about writing, and their ability to develop rhetorical flexibility and metacognitive strategies demanded of successful writers in their respective disciplines, was strongly influenced by the conceptions students had about writing upon entering college. To expand on this recent research, I examined how conceptual change about writing is demonstrated by students in their first semester of college from data received during students' First Year Writing (FYW) Seminar here, at Moravian. I planned to undertake this work through a series of grounded theory coding and writing assessment practice and theorized that some conceptual change about writing should be evident among students who have completed FYW.

Title: Jewish Holocaust Theology

Students: Natalie Slayton
Advisor: Dr. Jason Radine

Location: [Zoom](#) 10:00 AM - 10:15 AM

In the wake of the atrocities committed against the Jewish people by the Nazis during World War II, Judaism was forced to consider how the Holocaust impacts its traditional perceptions of God. In the decades that followed World War II, scholarship by Jewish thinkers began to emerge that attempted to answer this question, reaching a fever pitch after the Six Day War in 1967. The purpose of this project is to explore the various schools of thought that emerged from this scholarship about God, the establishment of the state of Israel through the lens of the Holocaust, and the changes that the Holocaust has wrought in Judaism.

Title: **Diverse Female Voices in Feminist Revisionist Fairy Tales**

Students: Camaryn Wheeler

Advisor: Dr. Crystal Fodrey

Location: [Zoom](#)

10:20 AM - 10:35 AM

This project is an analysis of feminist revisionist fairy tale artifacts in comparison to traditional and hegemonic fairy tales, in conjunction with feminist ideological research in order to further understand the lack of representation in terms of authorial race, gender identity, sexuality, class, ability, and appearance in feminist revisionist fairy tales. The root of my research is in the question of whether or not feminist revisionist fairy tales should be reserved for female authors/creators because of their inherent female narratives and viewpoints. Women of color and non-binary folks have often been excluded from this genre, and this begs the question of whose voices exactly need to be bolstered within the genre of feminist revisionist fairy tales. What types of representation and intersectionality, if any, are present within this genre and why?

Title: **The Neuroprotective Effects of Curcumin and Vitamin E in a 6-Hydroxydopamine Rat Model of Parkinson's Disease**

Students: Chloe Mondok

Advisor: Dr. Cecilia Fox

Location: [Zoom](#)

10:40 AM - 10:55 AM

Parkinson's disease is a common neurological disorder that is growing in prevalence among older populations. One of the reasons it is thought to develop is due to cellular changes that impair dopamine neurons in the nigrostriatal pathway. Curcumin has been shown to have anti-inflammatory and antioxidative effects which reduce inflammation and free radical levels; additionally, vitamin E is an antioxidant that also reduces lipid peroxidation, thus reducing cellular damage. Both curcumin and vitamin E have demonstrated neuroprotective properties in Parkinson's disease models. In this study, curcumin and vitamin E were used to determine whether there could be an enhanced neuroprotective effect in a 6-hydroxydopamine rodent model of Parkinson's disease. Experimental animals received dietary curcumin and vitamin E for 8 weeks post-lesion. During this time, behavior testing assessed motor function and included the rotarod, foot fault, and cylinder tests. These results demonstrated a trend in neuroprotective effects for experimental subjects. Immunohistochemistry was performed to determine the percent survival of dopamine neurons remaining in the substantia nigra. Though no significant difference was found in dopamine cell survival between control ($M = 29.78$) and experimental ($M = 51.74$) subjects, this reflects a trend in neuroprotection of curcumin and vitamin E in Parkinson's disease models.

Student Oral Presentations III

[ZOOM LINK](#)

11:20 – 12:15 PM

Moderator: Dr. Kara Mosovsky (Biological Sciences)

Title: **Clumsy Packing of Polyominoes**

Students: Emma Miller

Advisor: Dr. Nathan Shank

Location: [Zoom](#)

11:20 AM - 11:35 AM

In the most general definition, polyominoes are sets of n cells, such as dominoes or tetrominoes commonly seen in Tetris. We look at packing these polyominoes on a grid such that the least amount of pieces can be placed on the board without being able to place any additional pieces, which is known as the clumsy packing of a specific polyomino on a specific board size. We will focus on the clumsy fixed and free packings of T, L, plus, and rectangular polyominoes packed on an $n \times n$ grid, as well as additional properties such as packings in general and unique packings. This research, which was conducted as a summer SOAR project, has since been expanded onto an additional project that

focuses on an application of the study, Cram with Higher Polyominoes. We will briefly discuss this game, which is adjacent to the well known two-player impartial combinatorial game, Cram, but manipulated to consider polyominoes larger than size 2.

Title: The Connexin 43 Carboxyl-Terminus Tail as a Src Inhibitor in Cancer Cells
Students: Alec Buttner
Advisor: Dr. Anastasia Thévenin
Location: [Zoom](#) 11:40 AM - 11:55 AM

Connexin 43 (Cx43) is a transmembrane protein that comprises Gap Junctions (GJs) - protein channels that connect neighboring cells, allowing for the transport of molecules and ions. The Cx43 carboxyl-terminal tail (Cx43CT) serves a tumor-suppressive function due to its interaction with Src, a proto-oncogenic signaling kinase. When Src interacts with Cx43CT in the Src binding region, two proteins (Csk and PTEN) are recruited to the Cx43CT to inactivate Src. Serine residues 279 and 282 are in the Src binding region of Cx43CT and are known to be phosphorylated by a number of kinases. We aim to define the optimal conditions for Src/Cx43 interaction and are testing how S279 and S282 phosphorylation affects this interaction. We utilize phosphomimetic Cx43 mutants at these sites, both in vitro and in cancer cells, in a series of co-immunoprecipitation and western blotting analyses. The results of our work will help inform our design of Cx43-based peptides for targeted delivery to cancer cells.

Title: The Neuroprotective Effects of Capsaicin in the 6-Hydroxydopamine Model of Parkinson's Disease
Students: Riley McHugh
Advisor: Dr. Cecilia Fox
Location: [Zoom](#) 12:00 PM - 12:15 PM

Parkinson's Disease (PD) is a neurological condition caused by the degeneration of dopaminergic neurons throughout the nigrostriatal pathway. Neuroinflammation, as a result of oxidative stress, has been seen to be one cause of chronic degeneration. Capsaicin, a historically powerful anti-inflammatory with antioxidant properties, decreases both peripheral and central nervous system inflammation in the rat lesion model of PD. This study investigated the neuroprotective potential of capsaicin in rodents challenged by the neurotoxin, 6-hydroxydopamine. The experimental group was injected with 0.25 mg/kg of capsaicin in 0.1 mL vehicle of DMSO three times per week for eight weeks, while control animals received only DMSO vehicular injections. Behavior testing was then administered for 8 weeks, concurrent with the intraperitoneal injections. Data from the behavior testing indicates significant motor protection for the experimental group in the rotarod test. The foot fault test data suggests the control group performed significantly worse over the length of the experiment compared to the capsaicin-treated group which saw no significant differences over the same period. Brain tissue from each group was processed for tyrosine hydroxylase immunocytochemistry. It was determined that there was no significant difference in dopamine cell survival between both groups, signifying the importance of further research.

Student Oral Presentations IV

[ZOOM LINK](#)

1:00 – 2:15 PM

Moderator: Dr. Alison Holliday (Chemistry)

Title: Securely Insecure
Students: Cassandra Hoffmann
Advisor: Natessa Amin
Location: [Zoom](#) 1:00 PM - 1:15 PM

This project takes a look into body insecurities and body image through a body of artwork and research-based writing standpoints. The project documents the first-person perspective of personal body-related insecurities and their effect on my life and, in turn, my studio practice. Another thing the project discusses are female artists in art history who have explored similar topics and subject matter in their practices. Discussion of what body insecurities are, their causes, and how we conceal things about our bodies from others are fleshed out within the paper. The objective of this project is to see if art can heal and create confidence in one's body.

Title: **The Role of Cognitive-Behavioral Therapy Strategies in Promoting Effective Communication and Confidence in Artists**
Students: Melissa R. Strom
Advisor: Dr. Kristin Baxter & Susan Morelock
Location: [Zoom](#) 1:20 PM - 1:35 PM

The purpose of this study was to investigate the role of mindfulness strategies in one art student's practice, and how those strategies might benefit artists, especially those with anxiety. Cognitive-behavioral therapy (CBT) and mindfulness strategies strengthen one's capacity to function in society. Artists can use CBT to more effectively communicate with their audience, increasing confidence. Data collection included employing and analyzing CBT strategies, collecting found textiles, images, and antiques, while making paintings and found object assemblages for my senior thesis exhibition. Psychology resources, alongside historic and contemporary artworks, helped determine how mindfulness affects artists' well-being, technical skills, and activist involvement.

Title: **The Effect of Ocean Acidification on Dominance Hierarchy Formation in Pagurus longicarpus**
Students: Morgan Weaver
Advisor: Dr. Josh Lord
Location: [Zoom](#) 1:40 PM - 1:55 PM

Burning of fossil fuels and releasing carbon dioxide into the atmosphere is causing the ocean to become more acidic. Like other environmental changes, acidification is expected to cause significant disturbances to ecosystems and have effects on organisms interactions and behavior. Ocean acidification can make it more difficult for some marine organisms to build shells, find food, or sense predators. In this study, the long-clawed hermit crab, Pagurus longicarpus was observed under acidified conditions to determine if pH had an effect on dominance hierarchy formation. Interactions between individuals were analyzed using a scoring system to differentiate between dominant, moderate and submissive hermit crabs. Under the acidified water treatment, hermit crabs formed weaker hierarchies as exhibited by their lower scores. Additionally, the number of agonistic interactions decreased with time under both the control and acidified conditions. It also took P. longicarpus significantly longer to find food in the acidified trials as compared with that of the control trials. These findings suggest that acidification may alter the behavior, olfactory sensing and interactions of hermit crabs and other marine species in the open ocean.

Title: **Investigating pH Dependency of LamD Cyclization**
Students: Elizabeth Jones
Advisor: Dr. Michael Bertucci
Location: [Zoom](#) 2:00 PM - 2:15 PM

This research focuses on modifications to the LamD peptide in Lactobacillus plantarum, which is the peptide that contributes to the regulation of bacterial quorum sensing. Quorum sensing is the method that bacteria use to communicate with one another by utilizing chemical signals as autoinducers in areas with increased cell density. Specifically in this project, different pH buffers are being tested with LamD to determine if the cyclization for this cyclic peptide is pH dependent. This is significant because knowing the pH dependency can help establish the modifications that need to be made to the peptide to control quorum sensing, as well as identify the active form of the peptide. As of now, the experiments that have been run for this project consist of synthesis of Linear LamD,

purification of Linear LamD, and cyclization of LamD with water and buffer to analyze spectra differences. For near future work, many more cyclization experiments utilizing buffers with various pH levels are to come for analysis.

Student Oral Presentations V

[ZOOM LINK](#)

2:40 – 3:50 PM

Moderator: Dr. Sandy Bardsley (History)

Title: Ballet or Court Dance? Exploring the Foundations of the Classical Ballet in the Court of Louis XIV, 1650-1700
Students: Colby Robertson
Advisor: Dr. Heikki Lempa
Location: [Zoom](#) 2:40 PM - 2:55 PM

Louis XIV's played an important role in shaping classical ballet. But what was ballet? How was ballet different from traditional court dance? The scholarship has not come to a definitive conclusion. Wendy Hilton claims that Louis XIV elevated court dance and ballet, painting Louis XIV as the sole innovator for dance in France, whereas Robert McBride suggests that ballet was already practiced in France due to Cathrine de Medici. Louis XIV modeled court dance after her ballet. In order to shed more light on the relationship between court dance and ballet, I analyzed contemporary accounts of ballet and reports of court life. I also turned to dictionaries of the time period to understand the usage and introduction of dance terminology. Based on this analysis, I suggest that ballet and court dance in Louis XIV's court were no different in movement, style, and practice.

Title: Sex Role Socialization in Childhood in Relation to Its Impact on Future Career Choices
Students: Caitlin Roth
Advisor: Dr. Adams O' Connell
Location: [Zoom](#) 3:00 PM - 3:15 PM

Sociologists argue that gender is a socially ingrained concept, that we “perform” in ways that represent traits of masculinity and femininity to other members of a society in order to express our gender identity. Gender identity is introduced at a young age, and is reinforced by gendered play, parental influence, and interactions with peers. Expected gender roles have a significant impact illustrated in the workforce as certain careers are predominantly “male” or “female” dependent on the assumed attributes they possess based on their assigned gender fit. If we recognize that gender is a social construct, why do we still associate certain behaviors with certain genders? Why do we impose a gender identity on our children? What impact do these rigid gender expectations have on children later on in life, especially in the workforce, and how does it affect the way they see themselves? How does it affect the way they see their peers and the world itself? In this study, I asked current college-aged students as well as staff and faculty members at a college about their experiences with gender roles and sex role socialization in their childhood, as well as their views on certain career choices in terms of femininity and masculinity. This information was collected from surveys and interviews distributed at a small liberal arts college in the Northeast. By examining the toys that these college age students played with in their childhood, their current views on gender roles in children's play and career choices, as well as their prospective career goals, we aim to test if there is a correlation between future career choices and sex-role socialization in formative years.

Title: The Material Middle Ages
Students: Salma Ibrahim, Gabriel Crouthamel, Sarah Ryan, Audrey Templeton, Amber Capurso
Advisor: Dr. Sandy Bardsley
Location: [Zoom](#) 3:20 PM - 3:50 PM

Students in History 116 present the results of semester-long projects in which they planned, executed, and documented their efforts to recreate some aspect of medieval culture. Process mattered more than product! Many students noted a new respect for the skills of medieval craftspeople. These mini-papers represent some of the more interesting projects in which students reflect on both what they made and -- more importantly -- what they learned about medieval culture. Projects include the recording of a musical fanfare, creation of a working trebuchet, making medieval food, and reconstruction of Byzantine mosaics and embroidery.

Student Poster Presentations I

[ZOOM LINK](#)

12:00 - 1:00 PM

Title: Dominance Hierarchies in Freshwater Shrimp

Students: Rachel Moser

Advisor: Dr. Josh Lord

Location: [Zoom](#)

Aquatic invertebrates are one of the known categories of organisms that exhibit social dominance hierarchies. Currently, there is a significant amount of data on the hierarchies of various saltwater shrimp species compared to the minimal amount of research conducted on freshwater shrimp species. The species used in this study is Palaemonetes paludosus, a freshwater grass shrimp native to the east coast of the United States. For this study, an arena with two different shelter qualities was set up and shrimp were selected by size ranging from small to large. Each size was assigned a tag color and was recorded in the arena for a duration of 24 hours. Photographs captured from the recordings were then put into a computer software program, ImageJ, that tracks the location of each color tag and gives an average of where they have been. These photographs have shown that the more dominant shrimp will occupy the better shelter. From this, we can conclude that there is a similarity between the dominance hierarchy that exists in saltwater shrimp and the hierarchy that exists in freshwater shrimp.

Title: Interpersonal and Intrapersonal Emotion Regulation Efficacy: The Role of Interpersonal Trust and Anxiety

Students: Lauren Kubic

Advisor: Dr. Aleena Hay

Location: [Zoom](#)

Emotion regulation is how we change the type, intensity, duration, and overall experience of our emotions. Emotion regulation can fall under two categories: interpersonal or intrapersonal. Interpersonal emotion regulation occurs when we use a social outlet to help us regulate our emotions. On the other hand, intrapersonal emotion regulation occurs when we internally regulate our emotions without the help of another person. This study looks at the efficacy of using the emotion regulation strategy of reappraisal (changing the meaning of emotion-provoking stimuli to lower the emotional intensity) in intrapersonal and interpersonal contexts. The study also explores the role of perceived trustworthiness of a partner in interpersonal contexts and baseline anxiety levels on emotion regulation efficacy. Results indicate that there is a significant difference in both positive and negative emotions when we naturally regulate our emotions and when we use reappraisal to do so. Results also indicate that individuals with clinical levels of anxiety behave differently than those with nonclinical levels of anxiety when regulating negative emotions when their partner is perceived as trustworthy.

Title: Dots and Lines Reworked

Students: Garrison Koch, Saleh Abdussalam, Rey Anaya

Advisor: Dr. Nathan Shank

Location: [Zoom](#)

For decades, the simple game of dots-and-boxes has been played by children and adults alike. In the traditional version of the game, when a player closes a box, that player then makes another move anywhere on the board. For our research, we wanted to investigate the effects of the players not being able to make another move after completing a box. Simplifying the rules in this way allowed us to deduce which player would always win depending on the dimensions of the board. We continued our findings to include playing on the diagonals of square shaped boards as well as playing on a triangular shaped board.

Title: Consequences of Additional Parameters in Sudoku
Students: Kayla Valle, Jean-Pierre Appel, Kyle Adams, Aidan Malloy, Paul Petre
Advisor: Dr. Nathan Shank
Location: [Zoom](#)

In this project, we attempt to simplify the process of solving Sudoku boards with various different parameters. While maintaining the rules of standard Sudoku, we worked to create solutions to boards with additional restrictions. After solving multiple example boards with these restrictions, patterns were analyzed within individual cells as well as on a larger scale to establish a basis for our research. By isolating these restrictions we were able to create algorithms which solve the boards satisfying the initial conditions set forward by the parameters established. When combining these algorithms, a set of conditional statements can be set forward, wherein a wider variety of possible boards can be solved with greater ease and efficiency.

Title: Friendship, Attachment, and Satisfaction with Life in Adulthood
Students: Rosie Long, Hannah Pellicciotti, Kiana Faroun
Advisor: Dr. Michelle Schmidt
Location: [Zoom](#)

The current study examined the nature of adults' definitions of friendship and the associations between friendship, attachment, and life satisfaction in adulthood. Eighty-seven participants, 25-78 years old, participated in the People Across the Lifespan Study (PALS) which gathered quantitative and qualitative data. Results indicated that definitions of adult friendship primarily focused on cognitive aspects, followed by affective and behavioral aspects of friendship. Results suggest that positive friendship quality and attachment style meaningfully predict life satisfaction.

Title: Synthesis of dirhodium poly-L-glutamate
Students: Frederick Younes
Advisor: Dr. Stephen Dunham
Location: [Zoom](#)

Dirhodium(II,II) tetraacetate complexes ($Rh_2(OAc)_4$) are known for their cellular toxicity. This current research is on how to modify dirhodium complexes to become better at permeating cell membranes. The addition of polymers may allow rhodium complexes to more easily traverse the cell membrane through Enhanced Permeability and Retention, in which macromolecular drugs tend to accumulate in the lysosomes because the blood vessels of the cancer cell are comprised of misaligned endothelial cells, and therefore, the macromolecules are more able to permeate into the cells. Attaching the dirhodium complexes to the protein increases the number of dirhodium complexes entering the cell at any given time. Polymers of glutamic acid (poly-L-Glutamate, PLG) have been used as drug delivery agents for other anticancer drugs (paclitaxel). These experiments explore synthesis of $Rh_2(OAc)_3$ PLG and $Rh_2(OAc)_2$ PLG. Activated dirhodium complexes were reacted with a mixture of PLGn (protein) ($n=200$), a buffer with a pH of 4.7 comprised of 2-(N-morpholino)ethanesulfonic acid (MES), and water. To test the varying degrees of the % bound of the dirhodium to the proteins they were first put through a 1,000 Mw filter to remove unbound dirhodium, then a modified BCA assay was used to determine the protein concentration and Atomic Absorption was used to determine the rhodium concentrations. In addition, MALDI mass spectroscopy was used to determine the extent of dirhodium binding.

Title: Measuring Color Change as a Non-Invasive Method to Monitor Stress Levels in Amphibians
Students: Midelys Franceschini
Advisor: Dr. Sara McClelland
Location: [Zoom](#)

Amphibian populations worldwide are in danger of extinction. Many of the ecological threats they face have been shown to increase the concentration of corticosterone, the main stress hormone in amphibians. Monitoring corticosterone can provide information on habitat quality and the health of amphibian populations. Traditional methods of measuring stress in amphibians are lethal or invasive, which can impact already declining population

numbers. It is imperative to find non-invasive methods for monitoring stress to aid in conservation efforts. Previous studies in birds and fish showed a change in pigmentation due to chronic stress. This study aimed to determine if skin color changes due to stress in tadpoles. I hypothesized that chronically stressed tadpoles would be lighter. In a previous experiment, tadpoles were exposed to either exogenous corticosterone or a vehicle control for three weeks. To determine if stress levels were associated with color change, I measured the brightness of tadpole bodies using ImageJ. Amphibians provide beneficial services for humanity including controlling disease vector populations by eating insects, and as a source of pharmaceuticals. This novel research is the first step in enabling us to use coloration to monitor the health of amphibians and to ensure that future generations of frogs recover.

Title: Effects of Predator Cues on Social Hierarchy Formation in the Grass Shrimp *Palaemon pugio*
Students: Samuel Rappaport
Advisor: Dr. Josh Lord
Location: [Zoom](#)

In order to better understand the social systems of the grass shrimp *Palaemon pugio*, this study examined the aggressive interactions indicative of hierarchy formation. Hierarchies are important in terms of allocating resources like food and shelter among participating individuals which, in the case of grass shrimp, appeared to exclusively be females. Shrimp were placed in arenas for hour-long durations, with their fights quantified over time. Once hierarchies were established among *P. pugio* shrimp, follow-up experiments were conducted to investigate the impacts of predator presence on these hierarchies. Low fight counts between shrimp in the presence of predator cues indicated that hierarchy formation was not occurring. Grass shrimp are an important species both ecologically and commercially, so it is important to understand how changes in hierarchy formation could affect their behavior and ecological role.

Title: DNA Binding Interactions of Novel Dirhodium Compounds
Students: Jessica Mickno
Advisor: Dr. Shari Dunham
Location: [Zoom](#)

Rhodium compounds are transition metal complexes largely underexplored for their biological activity. This work explores the anti-cancer potential of rhodium compounds by determining if they bind to DNA. DNA-binding can interfere with normal DNA processing and lead to cell death. In this study, transition metal complexes with two rhodium ions bridged by a variety of ligands are incubated with genomic double-stranded DNA (dsDNA). Portions of each metal-DNA reaction are removed and filtered at certain time points to separate any unbound metal complexes from the larger DNA. The retained DNA is washed and analyzed for how much metal complex is bound to it. The concentration of the bound metal is measured using graphite furnace atomic absorption spectroscopy (GFAAS) and the ratio of metal to DNA at each time point is calculated. Then, the amount of metal bound over time is plotted and used to determine the reaction rate, which is compared as the bridging ligands are changed. The results of these metal-DNA interactions will be presented and discussed with their relevance for the development of new potential anti-cancer drugs.

Title: A Comparative Analysis of Quorum Sensing in Two Pathogens, *Bacillus cereus* and *Streptococcus pneumoniae*
Students: Emilee Engler
Advisor: Dr. Michael Bertucci
Location: [Zoom](#)

This research focuses on the two bacterial pathogens, *Bacillus cereus* and *Streptococcus pneumoniae*. *B. cereus* is responsible for causing food borne toxic-infections, and is widely found in soil and food, making it a general threat to public health. *S. pneumoniae* is responsible for a multitude of illnesses including sepsis and pneumonia. The pathogens utilize quorum sensing (QS), which is a cell-density dependent form of bacterial communication, to establish an infection. For *B. cereus*, the main production results from the activation of the transcription factor, PlcR. The activity

of PlcR depends on the binding of its signaling peptide PapR7. Mutations were made within this heptapeptide to study the effects that they have on the QS of B. cereus. Specifically, the effects of N-methylation in PapR7 residues were observed. Similar to B. cereus, S. pneumoniae utilizes its competence stimulating peptide, CSP1 in relationship to the ComD1 receptor. Modifications previously made on this peptide have provided insights on how binding to the ComD1 receptor could be optimized, and how a combination with an N-terminus residue replacement could effectively inhibit QS. Using solid phase peptide synthesis (SPPS), a library of new peptides were synthesized, providing new insight about inhibition within these two QS systems.

Title: Toluene Extraction from Water Using SPME

Students: Cole Carey

Advisor: Dr. Alison Holliday

Location: [Zoom](#)

Toluene is a component of crude oil, used to refine paints, and is in many other household products such as nail polish removers and glues. Toluene is also found in gasoline and can be dangerous to humans if inhaled. This research is being conducted to create a method to be able to detect and measure the amount of toluene in water. This is helpful for the case of gas spills in water along with other things acting as pollutants. The analysis is being done using Solid Phase Microextraction (SPME) and High-Pressure Liquid Chromatography (HPLC). SPME extracts compounds from water onto a fiber which is then analyzed by usually boiling the compound off of the fiber. In order to use the HPLC, the SPME fiber will need to be desorbed in methanol instead. This process could prove to be useful for future compounds that don't easily boil. So far, it has been shown that there is a relationship between toluene concentration and the signal that the toluene shows on the HPLC; as the concentration increases, the signal increases. Signal from a SPME extraction of toluene in water has also been recorded.

Title: Graphically Enhanced Augmented Reality's Role in Daily Life

Students: Trey Adams

Advisor: Camille Murphy

Location: [Zoom](#)

As technology advances, it becomes increasingly incorporated into our daily lives. An area that we see a heavy influence of technology is social life. With on average two and a half hours of social media consumption a day, or eight hundred and seventy-six hours a year, social media has become a massive part of many people's daily lives and a central part of their social lives (Statista). Social media, being such a pertinent part of the world's social interaction and life, has inadvertently created many negative mental health repercussions on the user causing impacts on their anxiety, depression, and self image Social media while flawed does bring about many positive technological advancements, one example being its pioneering of the widespread use of augmented reality. Augmented reality, while limited in its current state in social media, with a reconceptualization of its use, could further its beneficial nature and reshape the often toxic nature of social platforms by being integrated into a new platform that puts genuine social interaction and mental health above all.

Title: Seleno-L methionine's Effect on Burkholderia thailandensis Infection

Students: Sophia Starner

Advisor: Dr. Kara Mosovsky

Location: [Zoom](#)

Burkholderia pseudomallei is a bacterium that can cause a life-threatening condition, melioidosis, and replicates intracellularly causing this pathogen to be inherently more resistant to antibiotics. Burkholderia thailandensis is a great model organism to study B. pseudomallei since it is less infectious but still closely related. Therapeutics are being investigated for their effectiveness combatting B. thailandensis. One of these possible treatments is seleno-L-methionine (SeMet), which is a dietary antioxidant that has been proven in previous studies to lessen the bacterial burden during this kind of infection in white blood cells. To investigate the effects of current treatments along with the addition of SeMet, macrophages were infected with B. thailandensis for one hour before being treated with

combinations of ceftazidime, interferon-gamma, and SeMet over an 18 hour incubation period. It was found that the combination of ceftazidime and interferon-gamma has proven to be the most effective treatment thus far, with or without SeMet. Future research will be conducted looking at the levels of anti-inflammatory cytokine, IL-6, secreted by these macrophages.

Title: The Use of Macrophage Infection Model to Determine the Effect of Antioxidant Seleno-L-methionine on Phagocytosis and Inflammation

Students: Kasey Hanlon

Advisor: Dr. Kara Mosovsky

Location: [Zoom](#)

Burkholderia pseudomallei is a pathogenic bacterium that can live inside host cells and can cause the life-threatening infection called melioidosis. *Burkholderia thailandensis* is a closely related, less infectious species that is used as a model organism for studying melioidosis. Because *B. pseudomallei* is inherently resistant to several classes of antibiotics, new therapies are needed to treat the disease it causes. Previous studies have shown that the dietary antioxidant, seleno-L-methionine (SeMet), decreases the bacterial burden in a laboratory model of infected white blood cells. One hypothesis was that the antioxidant was increasing uptake of bacteria within the host white blood cells used in the infection model. Therefore, phagocytosis assays were conducted to determine if SeMet has any effect on the rate of phagocytosis during infection. These assays were run at 3, 6, 12, and 18 hour infection models. The assays used a combination of *B. thailandensis* alone, latex beads alone, or both together. Treatments consisted of SeMet alone or in addition to a white blood cell activator. So far, the data has shown no statistical significance between the different treatment groups. Therefore, further mechanisms of SeMet's effect on the infection model have to be understood.

Student Poster Presentations II

[ZOOM LINK](#)

4:00 - 5:00 PM

Title: Assessing Nurses' Knowledge of the Care of Clients with Autism Spectrum Disorder Seeking Treatment in the Emergency Department: A Mixed Methods Study

Students: Alexa Hromyak

Advisor: Dr. Paulette Dorney

Location: [Zoom](#)

The purpose of the research study is to evaluate nurses' knowledge and care of clients with Autism Spectrum Disorder (ASD) seeking care in the Emergency Department (ED). Individuals with ASD often seek health care through an emergency department instead of a primary care physician. Research suggests, clients with ASD experience environmental, monetary, timely, sensory and auditory barriers when seeking primary care. A descriptive mixed methods study was conducted using the Knowledge about Childhood Autism Among Health Workers (KCAHW) questionnaire and a demographic/researcher developed tool. Emergency department nurses that chose to participate were evaluated on their knowledge and perceptions regarding care for individuals with ASD. Additionally, nurses who participated were asked to disclose information regarding their nursing education and any other information they felt pertinent to the care of clients with ASD. Data was analyzed using quantitative and qualitative methods. Results of the study have implications for the nursing community to enhance education, practice and research.

Title: Inhibition of Src Activity in Human Prostate Cancer Cells upon Expression of Cx43 Gap Junctions

Students: Rachel Riley

Advisor: Dr. Anastasia Thévenin

Location: [Zoom](#)

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 this modification to the protein is 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 cancer cells. Recent work in our lab has identified that phosphorylation of S373 on Cx43 C-terminus results in greater binding 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 replicating experiments that clearly show this interaction between Cx43 and Src, as well as further studying the binding interactions and roles of two additional proteins, Csk and PTEN, in the inhibition of Src activity.

Title: Synthesis and Characterization of Glucose Conjugated Rhodium Complexes

Students: Elliott Guido

Advisor: Dr. Stephen Dunham

Location: [Zoom](#)

A common treatment for cancer as of the moment is chemotherapy, and while it does kill cancer cells it often can not distinguish between a healthy cell and the cancer cell. This inability to target just cancer cells is one main problem with chemotherapy and is essentially what is addressed in this experiment. The goal of this project was to synthesize dirhodium based drugs with sugars attached in order to target different kinds of cancer cells. It is believed that in most cancer cells the uptake of glucose into the cell is increased due to the over expression of Glucose transport proteins, so the theory behind putting a sugar on the cancer killing dirhodium agent is that we hope to increase the specificity of the drug so it will only target and kill these high glucose craving cells and leave normal cells alone. The sugars were

modified with carboxylic acids in order to be added onto the diridium. The reactions were both monitored and purified via HPLC and the finalized structures were then determined via NMR.

Title: Capillary Electrophoresis Identification of Rhodium-DNA Interstrand Cross-linkage

Students: Alec Brisbois

Advisor: Drs Shari Dunham & Alison Holliday

Location: [Zoom](#)

Rhodium complexes can interact with DNA and, in doing so, have potential to kill cancer cells. The interactions between a rhodium complex and DNA could be interstrand or intrastrand binding. In order to visualize Rh-modified DNA, a new separation method using capillary gel electrophoresis (CGE) was evaluated; this method uses UV light absorbance to visualize the compounds instead of a fluorescent stain/tag. This research project seeks to determine if CGE is able to separate rhodium modified DNA from unmodified DNA, whether these results are comparable to standard gel electrophoresis, and if the percentage of interstrand Rh-DNA adducts can be measured. In the analysis of Rh-modified DNA, separate peaks were expected for unmodified denatured DNA, denatured Rh-modified DNA with interstrand linkages, and denatured Rh-modified DNA with intrastrand linkages. However, denaturing of the DNA samples did not occur using CGE and the project shifted to slab gel electrophoresis with the use of Sybr® Gold stain for DNA imaging. After binding DNA to rhodium, dPAGE gels were used to separate and identify interstrand Rh-modified DNA versus intrastrand Rh-modified DNA. Preliminary results from this experiment revealed that the interstrand cross-linkages appear higher on the gel compared to intrastrand cross-linked DNA and unmodified DNA.

Title: Fixed Cram with Higher Polyominoes

Students: Emma Miller, Gabrielle Demchak, Victoria Samuels, Jacob Freeh, Jacob Smith

Advisor: Dr. Nathan Shank

Location: [Zoom](#)

A polyomino is a set of n cells such as a domino or a tetromino from the popular game Tetris. We explore optimal strategies for playing Fixed Cram with Higher Polyominoes. Cram is a well-known impartial combinatorial game where each player places a domino on a square grid orientated either horizontally or vertically. We define Fixed Cram as not being played with both horizontal and vertical pieces. In the game play, we set the number of players, board size, and singular game piece prior to the start of the game. In order to win our game, you need to be the last person to lay a polyomino so that the next player cannot lay another piece. In this project, we examine the patterns between symmetrical and non-symmetrical pieces on specific square board sizes.

Title: Digital Interpersonal Emotion Regulation and In-Person Interpersonal Emotion Regulation: The Role of Anxiety, Depression, and Stress

Students: Sean McFarland

Advisor: Dr. Aleena Hay

Location: [Zoom](#)

With the rise of teletherapy, there is increasing necessity to understand how this modality changes emotionality in the therapeutic experience. Interpersonal emotion regulation (IER) is defined as the process by which individuals change their emotional experiences by socially interacting with others. While the literature on IER in in-person settings is growing, there is a dearth of research exploring IER in digital social interactions- especially when considering the presence of psychopathologies. The present study investigates the tendency to use and efficacy of IER in digital versus in-person settings, and explores how the presence of anxiety, depression, and stress affect this. Baseline levels of anxiety, depression, and stress were measured using the DASS-21. The study also utilized two modified versions of the Interpersonal Regulation Questionnaire (IRQ) to measure tendency to use and efficacy of IER in digital and in-person settings. Participants also reported their satisfaction with digital and in-person therapy. Participants reported in-person IER as more efficacious than digital IER, and also reported higher satisfaction with in-person therapy than digital therapy. This study addresses a critical gap in our understanding of emotion regulation in digital environments and how this is related to psychopathology and the psychotherapy experience.

Title: Effects of Ocean Acidification on the Foraging Patterns of Atlantic Horseshoe Crabs

Students: Thomas Mateo

Advisor: Dr. Josh Lord

Location: [Zoom](#)

*Ocean acidification has become a grave concern for marine biologists as the resulting change in chemical composition of the water has been interfering with the bodily processes of countless marine organisms. One organism that has not had its response to acidification tested, however, is the Atlantic horseshoe crab (*Limulus polyphemus*). It was thought that changes in the acidity of water would affect the horseshoe crabs' ability to forage, which was the focus of this study. Many juvenile horseshoe crabs were run through y-maze choice experiments in groups of six in both control and acidified water to test their ability to sense and find food. Additional experiments were run with sand in the mazes and with buried food in order to simulate a natural environment. The horseshoe crabs that went through the y-maze with control water had an average success rate of 56% and an average completion time of 199 seconds, while in acidified water they had an average success rate of 40% and completion time of 257 seconds. Both success rate and decision-making time were substantially affected by acidification, suggesting that horseshoe crabs may struggle to efficiently find food in future ocean conditions.*

Title: Effects of Cyclohexylalanine and Homoleucine Substitutions on CSP1 binding

Students: Naomi Rieth

Advisor: Dr. Michael Bertucci

Location: [Zoom](#)

*CSP1 is a peptide released by the bacteria *Streptococcus pneumoniae* for a type of bacterial communication called quorum sensing. CSP1 in particular is responsible for the ability of *S. pneumoniae* to take in DNA from its surroundings. This could allow the bacteria to become antibiotic resistant which is a major concern in modern medicine. *S. pneumoniae* is an important target for research because it causes several human diseases such as pneumonia and meningitis. This project focuses on using solid phase peptide synthesis (SPPS) to develop versions of CSP1 with amino acid substitutions to the hydrophobic binding face of the native peptide using non-native and hydrophobic amino acids. By creating these peptide analogs with homoleucine and cyclohexylalanine, we can use biological assays to determine changes to the binding efficiency of CSP1. In time, these peptides can be created into inhibitor versions which could outcompete the native CSP1 peptide and prevent quorum sensing in *S. pneumoniae*.*

Title: Regulation of Cx43-Src Interaction in Cancer Cells by Mitogen Activated Protein Kinases (MAPKs)

Students: Liz Perez

Advisor: Dr. Anastasia Thévenin

Location: [Zoom](#)

Gap Junctions (GJs) are protein structures that form pores between neighboring cells, thus allowing for direct cell-cell communication. Connexin 43 (Cx43) is a protein that makes up GJs and serves a tumor suppressive function in cancer cells by recruiting and inhibiting a potent cancer driving protein (oncogene) called Src. Our lab has hypothesized that Cx43-Src interaction is regulated through Cx43 phosphorylation (a type of chemical modification) by a family of enzymes called Mitogen-Activated Protein Kinases (MAPKs). MAPKs are known to phosphorylate Cx43 within or near the Src-binding region. MAPK family consists of three different kinase members (ERK, JNK and p38) and we aim to understand if all three kinases are able to regulate Cx43-Src interaction. We have confirmed that the MAPK ERK is able to phosphorylate Cx43 in vitro at serine sites 255, 279 and 282. We are now attempting to replicate these in vitro experiments directly in LNCaP prostate cancer cells. We have been able to activate ERK and its signaling pathway in these cells and will next focus on identifying Cx43 phosphorylations that result upon ERK activation. Ultimately, these experiments will help us gain clearer understanding of how ERK (and other MAPKs) regulate Cx43-Src interaction.

Title: Consequences of Ocean Acidification on Marine Snail Foraging Behavior

Students: Melissa Morales

Advisor: Dr. Josh Lord
Location: [Zoom](#)

The marine mud snail is an omnivorous scavenger that is extremely common in estuaries along the eastern Atlantic coast. The mud snail plays an important role in this ecosystem and utilizes its chemical sensing capabilities to detect food or predator cues in the water. In this study, marine mud snails were observed in normal and acidified seawater conditions to examine how ocean acidification may impact snail foraging behavior. When the ocean takes in carbon dioxide from the atmosphere, carbonic acid is made, this increases the acidity of ocean water which may provoke many different consequences. This study used a Y-maze tank that gave the mud snails the option of going into either a food chamber or an empty chamber. During the normal seawater trials, the snails were 86% likely to be successful and enter the food chamber. During the acidified seawater trials, the snails were only 26% likely to be successful and enter the food chamber. This study highlights the role of chemoreception in snails and may indicate that mud snail populations may struggle to find food if their environment becomes more acidic.

Title: The Synthesis and Characterization of Two Novel Rhodium Compounds

Students: Emily Saulino
Advisor: Dr. Stephen Dunham
Location: [Zoom](#)

This project intends to find a methodology that allows for the combinatorial synthesis of novel rhodium-maleimide-amine compounds in order to discover a new potential chemotherapeutic that may be used in place of drugs that are ineffective because of poor cellular uptake or resistance. Combinatorial chemistry allows for numerous compounds to be synthesized in a single step, instead of spending a large amount of time synthesizing, purifying, and analyzing individual complexes. Amines were chosen since past literature has shown their tendency to selectively react with maleimide, compared to thiols which were expected to react directly with the rhodium metal. Thus far, the ratios between reagents, reaction conditions, and kinetics of two different amine reactions have been studied. Products from these reactions are currently being analyzed and characterized by NMR and mass spectroscopies to find their exact structures. These same reaction conditions will be applied to perform a combinatorial synthesis where the starting rhodium-maleimide compound will be used to react with a multitude of amines to obtain tens to hundreds of new products. The eventual goal is to obtain many different compounds that can be tested for cytotoxicity in cancer cells.

Title: Lumbricus terrestris Genome Assembly

Students: Daniel Faudree
Advisor: Dr. Christopher Jones
Location: [Zoom](#)

Lumbricus terrestris serves the scientific community as a model organism for dissection, toxicogenomics, and ecotoxicological studies. The purpose of this project is to discover the order of the nucleotides that comprise the earthworm's genome. Through the use of computational programs in a specific order called a pipeline, the correct DNA sequence should in theory be assembled correctly. With the genome assembled, gene annotation can begin through the applied use of gene conservation with NIH's BLAST in conjunction with de novo assembly results. Which enables us to search through an indexed version of the starting data. Initially, histone genes were searched for and because they are one example of genes that are considered highly conserved.

Title: Moral Injury: What Role Does Religion Play?

Students: Michael Pados
Advisor: Dr. Kelly Denton-Borhaug
Location: [Zoom](#)

In this Religion Major Capstone Research Project, I am exploring moral injury in the lives of law enforcement officers. I address the following questions: What is moral injury, and how is it uniquely experienced in the lives of police

officers? How do people in law enforcement turn to religion as a resource for guidance, support and healing in the context of moral injury? I also explore the ways that religion contributes to the development of moral injury. Finally, my research explores possibilities to prevent moral injury from occurring by adjusting the way law enforcement is structured and implemented.

Title: Finding the Detection Limit of a Pesticide Using LC-MS

Students: Chad Propst
Advisor: Dr. Alison Holliday
Location: [Zoom](#)

This experiment was conducted to find the detection limit of a commonly used fungicide, captan, using LC-MS (liquid chromatography-Mass spectrometry). A low detection limit is essential for detecting pesticides at the concentrations present on commercial fruits and vegetables. This was done by creating a variety of standards decreasing in concentration from 10 ug/mL to 1.0×10^{-7} ug/mL. These standards were created by diluting the solution with a mixture of 80% H₂O : 20% MeOH. The LC portion was carried out using a varying mixture of two different solvents: an aqueous phase of 99.85% DI H₂O, 0.1% formic acid, and 0.05% ammonium, and an organic phase of 99.85% MeOH, 0.1% formic acid, and 0.05% ammonium. A rough estimate of the detection limit is between the concentrations of 1.0×10^{-5} ug/mL and 2.5×10^{-5} ug/mL. This should be a low enough concentration to test commercial fruits and vegetables.

Title: Pesticide Contamination in Wetlands: Impacts of Pesticides on Anuran Diversity and Abundance

Students: Janniry Cabrera Belen
Advisor: Dr. Sara McClelland
Location: [Zoom](#)

Amphibians are one of the most endangered classes of the Animal Kingdom. A lack of amphibian research has resulted in a disparity of available data to address their decline. One of the factors affecting amphibian populations are pesticides. Due to their permeable skin, these chemicals pose a serious threat to anuran health. Pesticides have been shown to affect physiology, reproduction, and behavior. My research project aims to survey local frog habitats to determine areas contaminated by pesticides, and whether the level of contamination is correlated with the diversity and abundance of anurans. Local frog habitats were found through the Fish and Wildlife Service Wetlands Mapper, and site visits were conducted to choose the most accessible sites. Frog calls and calling intensity were used to estimate frog diversity and abundance. Soil and water samples were taken and will be analyzed for pesticide contamination. I hypothesize that contaminated ponds will be located near agricultural fields or roadways where pesticides are typically applied, and that these ponds will have decreased frog abundance and diversity when compared to uncontaminated ponds. Understanding how the quality of frog habitat is impacting frog populations is key to being able to conserve amphibian populations throughout the Lehigh Valley.

Title: Mystery Cults: Cheating Death

Students: Tamar Giorgadze
Advisor: Dr. Jason Radine
Location: [Zoom](#)

From the beginning of time humans have understood that death is a part of life. However, for some people, death is not inevitable or irreversible. There are many myths that tell stories about deities who have "cheated" death one way or another. The fascination with these tales have birthed different mystery cults in various cultures and religions. There is a strong argument that Christianity itself, one of the biggest religions today, once started out as a mystery cult. This project examines what mystery cults are, closely inspects some of the mystery cults known throughout history, and explains the metamorphosis of Christianity from a mystery cult to one of the biggest religions in the world.

Title: Investigating the Effects of Different Washing Techniques on the Pesticide Residue Concentrations of Strawberries

Students: Nihal Capan
Advisor: Dr. Alison Holliday
Location: [Zoom](#)

Pesticides are used to prevent the damage of agricultural products from invasive weeds, insects, and fungus. As a result, many people wash fruits and vegetables before consumption. Previous research done on pesticides on fruits indicated that strawberries are one of the dirtiest fruits in terms of pesticide residue, and a fungicide called captan is the most commonly found pesticide on commercial strawberries. The goal of this research was to determine the effectiveness of various washing methods at removing captan and its metabolic degradation product THPI (Tetrahydrophthalimide) from strawberries. Gas Chromatography-Mass Spectrometry (GC-MS) was used to quantify the captan and THPI residues. Washing strawberries in a stream of running water for 30 seconds removed more pesticide than soaking in water, although not all pesticide was removed. It should be noted that higher than commercial concentrations of captan were applied on strawberries for the purpose of detection.

Title: Synthesis and Analysis of a Fluorescent Dirhodium Compound

Students: Tyler Geroulo
Advisor: Dr. Stephen Dunham
Location: [Zoom](#)

Rhodium complexes are utilized in the study and development of chemotherapy. The dirhodium (II,II) tetraacetate complex, Rh₂(OAc)₄, in this study was modified to increase permeation of the dirhodium complex through the cell membrane and to provide a fluorescent marker for the dirhodium. The dirhodium stock solution utilized was synthesized in a previous experiment and produced a stock of Rh₂(OAc)₃TFA. The Rh₂(OAc)₃TFA was reacted with a bulk solution of Fluorescein (2-(6-hydroxy-3-oxo-3H-xanthen-9-yl)benzoic acid) in a slightly acidic solution (pH ~ 6.0) consisting of 18M Ω H₂O, 1M HCl and 1M NaOH. The solubility of Fluorescein was studied alongside this initial reaction. Research concluded that for fluorescein to dissolve in the stock solution the pH must be raised to ~10. Then after getting the fluorescein to dissolve with the dirhodium stock solution, the pH was lowered to pH 6.0 to simulate biological conditions. The ratio of dirhodium complex to Fluorescein in this reaction was 1.2:8. The resulting product was then purified via High Performance Liquid Chromatography (HPLC) prep column and characterized by 1H Nuclear Magnetic Resonance (NMR) spectroscopy and 2D NMR.

Title: Synthesis of Optimized CSP1 Derivatives to Modulate Quorum Sensing in S. Pneumoniae

Students: Elizabeth Hutnick
Advisor: Dr. Michael Bertucci
Location: [Zoom](#)

Streptococcus pneumoniae is a commensal bacterium that is also an opportunistic pathogen. S. pneumoniae is one of the deadliest infections, causing a variety of illnesses. A communication system known as quorum sensing (QS) allows this pathogen to exhibit group behaviors that benefit survival, infection, and formation of resistance. Antibiotic resistance is a global threat to human health and the intervention of this communication system is postulated to be an avenue for curtailing the development of resistance in this bacterium. The bacteria utilize the competence stimulating peptide (CSP1) to recognize when the population is large enough to initiate pathogenic gene expression. The purpose of this project is to use methods of solid phase peptide synthesis, high-performance liquid chromatography, and biological assays to develop CSP1 derivatives that may out compete the native CSP1 peptide and intervene the QS circuit. Current results indicate that large, non-natural amino acids substituted for the hydrophobic residues of CSP1 give these derivatives a higher binding affinity at the ComD1 receptor. The CSP1 derivatives with an optimal EC₅₀ value are then synthesized into inhibitory peptides with an EIA substitution. These inhibitory peptides should halt the communication between the bacteria, stop the QS circuit, and ultimately slow formation of resistance.

2020 SOAR Summer Research Grant Recipients

Capillary Electrophoresis Identification of Rhodium-DNA Interstrand Cross-linkage
Alec Brisbois & Dr. Alison Holliday, & Dr. Shari Dunham

Creating Performance Editions from the Archives
Julian Calv & Dr. Hilde Binford
Assisted by Gwyneth A. Michel, Assistant Director, Moravian Music Foundation

Investigating the Effects of Different Washing Techniques on Pesticide Residue Concentrations of Commercial Strawberries
Nihal Capan & Dr. Alison Holliday

Caring for Patients with Obesity During a Disaster: An Integrative Review
Kathryn DeWitt & Dr. Karen Groller

Assembling the Earthworm Genome
Daniel Faudree & Dr. Christopher Jones

Synthesis and Characterization of Glucose Conjugated Rhodium Complexes
Elliott Guido & Dr. Stephen Dunham

Interpersonal Emotion Regulation and Anxiety
Lauren Kubic & Dr. Aleena Hay

Protective Effects of Curcumin on the Production and Metabolism of Dopamine in the 6-Hydroxydopamine Model of Parkinson's Disease
Raquel Lopez de Boer & Dr. Cecilia Fox

Computer Vision Tracking Framework for Parkinson's Disease Model-Rats
Renee Mapa & Dr. Jeffrey Bush

Mathematics Related to the Packing of Polyominoes and Strong Proper Connections of Graphs
Emma Miller & Dr. Nathan Shank
In coordination with the National Science Foundation (NSF) Research Experience for Undergraduates (REU) program in Computational and Experimental Mathematics at Moravian College

The Neuroprotective Effect of Dietary Curcumin in the 6-Hydroxydopamine Model of Parkinson's disease: A Cell Survival and Imaging Study
Chloe Mondok & Dr. Cecilia Fox

Comparing Predator Avoidance Behaviors In Different Marine Habitats
Samuel Rappaport & Dr. Joshua Lord

Cellular DNA-Binding of Select Rhodium Compounds
Charlotte Reid, Dr. Shari Dunham, & Dr. Anastasia Thevenin

Synthesis of quorum sensing activators and inhibitors of *S. pneumoniae* with large, non-native, aliphatic amino acid substitutions
Naomi Rieth, Elizabeth Hutnick, & Dr. Michael Bertucci

Characterization of Src activity in glioma cells upon expression of Cx43-based gap junctions
Rachel Riley & Dr. Anastasia Thevenin

Ballet of Court Dance? Exploring the Foundations of the Classical Ballet in the Court of Louis XIV,
1650-1700
Colby Robertson & Dr. Heikki Lempa

Towards a Measure of Conceptual Change: Understanding how First-Year Writing Complicates Students'
Prior Knowledge about Writing
Ryan Scott, Ms. Meg Mikovitz, & Dr. Crystal Fodrey

Hounds Transition Program: Exploring the Transition to Adulthood for High School Students with
Intellectual Disabilities through a Disability Studies in Education Framework
TahLea Wright & Dr. Laurie Kahn

Completed Honors Projects Spring 2020-Fall 2020

Madeleine Baker

Advisors: Carole Lutte and Dr. Cecilia Fox

Music Education

The Benefits of General Music Class on Middle School Adolescence and Brain Development

Elizabeth Horn

Advisor: Dr. Crystal Fodfrey

English

English's Most Complex Four-Letter Word: An Etymological and Rhetorical Analysis of "Nazi"

Riley Kirkpatrick

Advisor: Dr. Jeffrey Bush

Computer Science

Massively Parallel Exact Histogram Equalization

Sarah Penna

Advisor: Dr. Larry Lipkis

Music

The Human-Faith Melody and the Power of the Common Soul: Charles Ives and the Concord Transcendentalists

Honors Candidates Fall 2020-Spring 2021

Trey Adams

Advisor: Camille Murphy

Art/Graphic and Interactive Design

Graphically Enhanced Augmented Reality's Role in Daily Life

Rey Anaya

Advisor: Dr. Nathan Shank

Mathematics

Chromatic Number Reduction

Sonal Arora

Advisor: Dr. Anastasia Thévenin

Biochemistry

Does c-jun N-terminal kinase (JNK) regulate tumor suppressive function of Cx43 Gap Junctions?

William Brandes

Advisor: Dr. Jeffrey Bush

Computer Science

Automated Detection of Print Errors in Fused Deposition Modeling 3D Printers

Alec Brisbois

Advisors: Drs. Shari Dunham and Alison Holliday

Biochemistry

Capillary Electrophoresis Identification of Rhodium-DNA Interstrand Cross-linkage

Timothy Brunstetter

Advisor: Dr. Jason Radine
Global Religions
Biblical Prophecy: A Unique Form of Divination

Alec Buttner

Advisor: Dr. Anastasia Thévenin
Biochemistry
Defining the Interactions Between Src, a Cancer Causing Kinase, and the Cx43 Gap Junctions in Glioblastomas

Tevo'n Campbell

Advisor: Drs. Stephen Dunham and Anastasia Thévenin
Biochemistry
Effects of Dirhodium Compounds with Oleic Acid on Cervical Cancer Cells

Jesika DeDonato

Advisor: Dr. Stephen Dunham
Biochemistry
Effects of Sequence Context of DNA Bases on Stability and Metal Ion Binding

Emilee Engler

Advisor: Dr. Michael Bertucci
Chemistry
A Comparative Analysis of Quorum Sensing in Two Pathogens, *Bacillus cereus* and *Streptococcus pneumoniae*

Logan Farinhas

Advisor: Dr. Natasha Woods
Biology
The Effect of Leaf Litter on Emergence of Invasive Flora in Lehigh Valley and Surrounding Areas

Daniel Faudree

Advisor: Dr. Christopher Jones
Biology
Lumbricus terrestris Genome Assembly

Caroline Flora

Advisor: Dr. Crystal Fodrey
English
Growing Up on the Autism Spectrum

Ashlynn Forney

Advisor: Dr. Christopher Jones
Biology
The Impact of Bang Sensitivity on the Longevity in *Drosophila melanogaster*

Destiny George

Advisor: Dr. Faith Okpotor
Political Science
Terrorism in Africa: A Comparative Analysis of Boko Haram in Nigeria and Al-Shabaab in Kenya

Delia Geyer

Dr. Mark Koscinski and Daniel O'Connor
Economics
Analysis of the CEO Pay Ratio

Fadi Hanna

Advisor: Dr. Michael Bertucci
Biology
Generating (Δ lamD) *Lactobacillus plantarum* Mutant

Cassandra Hoffmann

Advisor: Natessa Amin
Studio Art
Securely Insecure

Alexa Hromyak

Advisor: Dr. Paulette Dorney
Nursing
Assessing Nurses' Knowledge of the Care of Clients with Autism Spectrum Disorder Seeking Treatment in the Emergency Department: A Mixed Methods Study

Elisabeth Kleppinger

Advisor: Dr. Faith Okpotor
Political Science
The Global Fashion Industry: Implications for Labor and Crime

Allyson Kovach

Advisor: Dr. Alison Holliday
Chemistry
The study of the interaction between a known WW2 Domain and Polyproline by use of fluorescence quenching

Lauren Kubic

Advisor: Dr. Aleena Hay
Psychology
Context Specificity in Emotion Regulation

Raquel Lopez de Boer

Advisor: Dr. Cecilia Fox
Neuroscience and Chemistry
Protective Effects of Curcumin on the Production and Metabolism of Dopamine in the 6-Hydroxydopamine Model of Parkinson's Disease: An Interdisciplinary Study

Sean McFarland

Advisor: Dr. Aleena Hay
Psychology
Comparing Digital Emotion Regulation and In-person Emotion Regulation In Individuals with Symptoms Consistent with Depression and Anxiety

Riley McHugh

Advisor: Dr. Cecilia Fox

Neuroscience

The Impact of Capsaicin on the 6-Hydroxydopamine Model of Parkinson's Disease

Chloe Mondok

Advisor: Dr. Cecilia Fox

Neuroscience

The Neuroprotective Effect of Dietary Curcumin in the 6-Hydroxydopamine Model of Parkinson's disease: A Cell Survival and Imaging Study

Liam Mulligan

Advisor: Dr. Larry Lipkis

Music

Musical Settings of Three Shakespeare Plays

Patrick Mullin

Advisor: Dr. Andrew Crooke

English

Critical Applied Linguistic and Contextual Language Influences on Ottoman-American Mahjar Texts of Kahlil Gibran

Samuel Rappaport

Advisor: Dr. Josh Lord

Biology

Effects of Predator Cues on Grass Shrimp Hierarchy Formation

Caitlin Roth

Advisor: Dr. Virginia Adams O'Connell

Sociology

Sex Role Socialization in Childhood and Its Impact on Future Career Choices

Daniel Salib

Advisors: Drs. Ruth Malenda and Kelly Kriebel

Physics

Effect of Friction Coefficients on Inelastic Collisions

Lara Slabber

Advisors: Kate Racculia and Dr. Robert LaRue

English/Africana Studies

Increased Diversity in Young Adult Science Fiction/Fantasy In the United States Over the Last Decade

Helen Smith

Advisor: Gregory Oaten

Music

Catch Your Breath: The Importance of Breath and Your Body

Gabrielle Stanley

Advisor: Dr. Crystal Fodrey and Meg Mikovits

English/Writing Studies

Investigating Factors That May Influence the Development of Student Conceptions of Good Writing

Melissa Strom

Advisors: Susan Morelock and Dr. Kristin Baxter

Art

Identity Construction and the Human Experience in Art-Making

Adam Strouse

Advisor: Dr. Shari Dunham

Biochemistry

Metal Ion Effects on the Enzyme Kinetics of a Phosphatase

Victoria Vargas

Advisor: Dr. Anastasia Thévenin

Biochemistry

Understanding Gap Junction Phosphorylation by p38 to Inhibit Tumor Growth

Morgan Weaver

Advisor: Dr. Josh Lord

Environmental Science

Effect of Ocean Acidification on Dominance Hierarchy Formation in *Pagurus longicarpus*

Tyra Wentz

Advisor: Dr. Christopher Jones

Biology/Genetics

Physical performance outcomes of *Drosophila melanogaster* as determined by diet and cardiac health

Student Research Conference Participation

National Conference on Undergraduate Research [virtual], April 20, 2021

Alec Brisbois

Capillary Electrophoresis Identification of Rhodium-DNA Interstrand Cross-linkage
Advisors: Dr. Shari Dunham & Dr. Alison Holliday

Alec Buttne, Emilee Engler, Kylie Chichura

Development of Quorum Sensing Inhibitors for *Streptococcus pneumoniae* Through Optimization of the Hydrophobic Binding Face and Substitution of the N-Terminus Residue
Advisor: Dr. Michael Bertucci

Alexa Hromyak

Assessing Nurses' Knowledge of the Care of Clients with Autism Spectrum Disorder Seeking Treatment in the Emergency Department: A Mixed Methods Study
Advisor: Dr. Paulette Dorney

Lauren Kubic

Interpersonal and Intrapersonal Emotion Regulation Efficacy: The Role of Interpersonal Trust and Anxiety
Advisor: Dr. Aleena Hay

Raquel Lopez de Boer

Protective Effects of Curcumin on the Production and Metabolism of Dopamine in the 6-Hydroxydopamine Model of Parkinson's Disease: An Interdisciplinary Study
Advisor: Dr. Cecilia Fox

Sean McFarland

Digital Emotion Regulation and In-Person Emotion Regulation: The Role of Anxiety, Depression, and Stress
Advisor: Dr. Aleena Hay

Riley McHugh

The neuroprotective effects of capsaicin in a 6-hydroxydopamine rodent model of Parkinson's disease
Advisor: Dr. Cecilia Fox

Jessica Mickno

DNA Interactions of Novel Transition Metal Complexes
Advisor: Dr. Shari Dunham

Chloe Mondok

The Neuroprotective Effects of Curcumin and Vitamin E in the 6-Hydroxydopamine Rat Model of Parkinson's Disease
Advisor: Dr. Cecilia Fox

Sarah Penna

The Human-Faith Melody and the Power of the Common Soul: Charles Ives and the Concord Transcendentalists
Advisor: Dr. Larry Lipkis

Emily Saulino

The Synthesis of Novel Rhodium Compounds Using Combinatorial Chemistry

Advisor: Dr. Stephen Dunham

Stephanie Sharp & Madison Van Duzer

Replication and Extension of Sparkman and Walton: Experiment 1 (2017)

Advisor: Dr. Dietlinde Heilmayr

Lara Slabber

Queer Representation in Young Adult Fantasy Novels

Advisors: Dr. Robert LaRue & Prof. Kathleen Racculia

Melissa R. Strom

Identity Construction and the Human Experience in Art-Making

Advisors: Prof. Susan Morelock & Dr. Kristin Baxter

Tyra Wentz

Endurance Exercise Outcomes of *Drosophila melanogaster* as Determined by Cardiac Health and Dietary Composition

Advisor: Dr. Christopher Jones

Eastern Psychological Association Conference [virtual], March 5, 2021

Kiana Faroun, Rose Marie Long, Hannah Pellicciotti

Friendship, Attachment, and Satisfaction with Life in Adulthood

Advisor: Dr. Michelle Schmidt

Annual LVAIC Psychology Conference, April 24, 2021

Madison Van Duzer, Stephanie Sharp

Replication and Extension of Sparkman and Walton: Experiment 1 (2017)

Advisor: Dr. Dietlinde Heilmayr

Association for Psychological Science Annual Convention, May 26, 2021

Sean McFarland

Digital Interpersonal Emotion Regulation and In-Person Interpersonal Emotion Regulation: The Role of Anxiety, Depression, and Stress

Advisor: Dr. Aleena Hay

Lauren Kubic

Interpersonal and Intrapersonal Emotion Regulation Efficacy: The Role of Interpersonal Trust and Anxiety

Advisor: Dr. Aleena Hay

259th National Meeting of the American Chemical Society, March 24, 2021

Emilee Engler

Quorum sensing inhibition in *Streptococcus pneumoniae* using optimized CSP1 modifications including a key E1A substitution

Advisor: Dr. Michael Bertucci

Alec Buttner

Synthesis of an inhibitory peptide for quorum sensing in *Streptococcus pneumoniae* through optimization of the hydrophobic binding face and substitution of the N-terminus residue

Advisor: Dr. Michael Bertucci

Lehigh Valley Society of Molecular and Cell Biology (LVSMCB) Annual Symposium, April 14, 2021

Rachel Riley

Inhibition of Src Activity in Human Prostate Cancer Cells upon Expression of Cx43-based Gap Junctions

Advisor: Dr. Anastasia Thévenin

Charlotte Reid

HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes

Advisors: Shari U. Dunham and Anastasia Thevenin

Sonal Arora

Does the Phosphorylation by MAP-kinases Impact the Tumor-Suppressive Function of Gap Junctions

Advisor: Dr. Anastasia Thévenin

Sonal Arora, Victoria Vargas

Does the Phosphorylation by MAP-kinases Impact the Tumor-Suppressive Function of Gap Junctions

84th Intercollegiate Student Chemists Convention (ISCC), April 10, 2021

Charlotte Reid

HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes

Advisors: Shari U. Dunham and Anastasia Thevenin

Jessica Mickno

DNA Binding Interactions of Novel Dirhodium Compounds

Advisor: Shari U. Dunham

*Lehigh Valley Local Section of the American Chemical Society,
Undergraduate Research Presentations & Award Ceremony, April 15, 2021*

Adam Strouse

Effects of Divalent Cations on Alkaline Phosphatases

Advisors: Shari U. Dunham

Charlotte Reid

HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes

Advisors: Shari U. Dunham and Anastasia Thevenin

Intercollegiate Student Chemists Convention, April 10, 2021

Charlotte Reid

HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes
Advisors: Shari U. Dunham and Anastasia Thevenin

Alec Buttner (First Place prize in Biochemistry)

The Connexin 43 Carboxyl-Terminus Tail as a Src Inhibitor in Cancer Cells

*Lehigh Valley ACS meeting, April 15, 2021
Tri-Beta Regional Conference, April 17, 2021*

Charlotte Reid

HeLa Cell Toxicity and Cellular DNA-Binding of Rhodium Complexes
Advisors: Shari U. Dunham and Anastasia Thevenin

Faculty for Undergraduate Neuroscience, October, 25, 2020

Raquel Lopez de Boer

The Neuroprotective Effects of Curcumin in the 6-OHDA Model of Parkinson's disease: A
Neurochemistry Study
Advisor: Dr. Cecilia Fox

Chloe Mondok

The Neuroprotective Effects of Curcumin and Vitamin E in the 6-Hydroxydopamine Rat Model of
Parkinson's Disease
Advisor: Dr. Cecilia Fox

*Joint Mathematics Meeting, January 8, 2021
The Student Mathematics Conference at Moravian College, February 13, 2021*

Emma Miller

Strong Proper Connection
Advisor: Dr. Nathan Shank

*The International Conference for High Performance Computing, Networking, Storage, and Analysis,
September 17, 2020*

Riley Kirkpatrick

Massively Parallel Exact Histogram Equalization
Advisor: Dr. Jeffrey Bush

3rd Youth Environmental Alliance in Higher Education

Chelsea Hill

Surging Glaciers & Sea Level Rise

Advisors: Drs. Diane Husic and Heide Svestre

SENIOR THESIS

VIRTUAL ARTIST TALKS

Tuesday, April 20, 2021, 4:20 p.m., VIA ZOOM

<https://moravian.zoom.us/j/92446480621>

In conjunction with
Scholarship Day, please
join us for creative
research presentations by
graduating seniors in
Studio, Graphic and Interactive
Design, and Art Education.



Moravian College encourages persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact Dave Leidich at leidichd@moravian.edu or 610-861-1622.

SENIOR THESIS EXHIBITION 2021

Thursday April 22 — Saturday May 8

AT PAYNE GALLERY

Moravian College | 346 Main Street, Bethlehem, PA 18018
610-861-1491 | www.moravian.edu/art/payne-gallery

The **Senior Thesis Exhibition** is the culminating experience of the art major, whereby students in Studio, Photo and New Media, Graphic and Interactive Design, Art Education, and Art History develop a strong cohesive body of work.

TREY ADAMS
MIGUEL ALT
GEORGES DABOURA
VICTORIA DEMUYSERE
MORGAN FEHNEL
SKYLAR GOLDSTEIN
CASSANDRA HOFFMANN
EMILY KOHLER
KYLE LENH
VIRIDIANA MONTESINOS CASTILLO
LUZ PERDOMO
SABRINA RATTIGAN
MELISSA STROM
JANESSA TERNOSKY
SKYLAR VAUGHAN



Moravian College encourages persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact Dave Leidich at leidichd@moravian.edu or 610-861-1622.