MORAVIAN UNIVERSITY

21st Annual Undergraduate Scholarship and Creative Endeavors Week

April 20 - 24, 2026

This year, 64 students, representing 16 different major programs, are giving oral and poster presentations during the 2026 Scholarship and Creative Endeavors (SCE) Week activities. Many thanks to their 23 faculty mentors/sponsors.

Additionally, numerous talented art, music, and theater students have participated in performances and art exhibits this spring, with many still to come in April.

Congratulations to these student scholars for all their accomplishments.

Acknowledgements

The 21st Annual Moravian University Undergraduate SCE Week 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:

Provost James Scifers

Deans Lesley Brown and Louise Keegan

Moravian Honors Program; Axel Hildebrandt, Honors Program Director

The Rokke Endowment for Student Research and the SOAR Program; Keith Wood, SOAR Program Director

Suzanne Moyer, Executive Director of Conference and Event Management

Michael Cook, Manager of Music & Art Operations

Kayla Erney, Academic Affairs Program Manager

Patricia Hartigan, Catering Director

URSCA Ambassador students:
Emily Alonge, Jillian Barrows, Emmanuel Bulted, Jesus Campos, Earianne Evangelista, Mary Jane Granito ('25), Nikki Guido, and Yousuf Kanan ('25) and Gwen Kester (’25), for her work on developing this student organization

Past Scholars Day/SCE coordinators:
Nathan Shank, Michelle Schmidt, and Diane Husic for their work to manage this celebration and promote undergraduate scholarship over the years

The UGRACE group who originally planned/organized this celebration in 2005:
John Black, Dennis Glew, Carl Salter, Kay Somers, Anne Dutlinger, Jim Skalnik, Michelle Schmidt and Curt Keim

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Undergraduate Scholarship and Creative Endeavors Week

Oral and Poster Presentations General Schedule[1]

Tuesday, April 21, 2026

11:00 a.m. – 12:00 p.m. — **Session I: Oral Presentations**
HUB 302

Noon – 1:00 p.m. — **Poster Session I**
HUB 450

1:30 – 2:30 p.m. — **Session II: Oral Presentations**
HUB 302

3:00 – 4:00 p.m. — **Session III: Oral Presentations**
HUB 302

4:00 – 5:00 p.m. — **Poster Session II**
HUB 450

Wednesday, April 22, 2026

Noon – 1:00 p.m. — **Poster Session III**
HUB 450

4:00 – 5:00 p.m. — **URSCA All-Stars Celebration Reception**
(awardees list on next page)
All are welcome to come celebrate with us!
Payne Gallery (Hurd campus)

[1] Full session details on p. 5 and abstracts start on

2026 URSCA All-Stars

	Celebrated student researcher	and faculty mentor
Art	Emma Kressler	Natessa Amin
Biology	Mia Espinal	Dan Proud
Chemistry	Mathew Peiffer	Godfred Fianu
Education	Emily Alonge	Laurie Kahn
English and Writing Arts	Fatimah Bouri	Elizabeth Gray
Global Religions	Hope Sostarecz	Kin Cheung
Health Sciences	Mary Jane "MJ" Granito	
Mathematics	Kristian “Krissy” Wolf	Shannon Talbott
Modern Language & Literatures	Sean Riedy	Axel Hildebrandt
Music	Elizabeth Hutchinson	Larry Lipkis
Neuroscience		Sara McClelland
Nursing	Connor Griffon	Elise Colancecco
Philosophy	Onyxx Montalvo	Austin Baker
Psychology	James Baladi	
Public Health	Allison Plitnic	Tanu Altomare
Rehabilitation Sciences: Occupational Therapy	Marena Aboud	Sara Benham
Theater	Ry Kral	

Presentations - Detailed Schedule

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

Tuesday, April 21, 2027

ORAL SESSION I

Oral Presentations Session I: Moderator – Dr. Sarah Johnson HUB 302		
Student(s)	Project Discipline(s)	Advisor(s)
11:00 AM **Jesus Campos**	Biology	Dr. Joshua Lord
Behavioral Geography: Anti-Predator Mobbing and Social Hierarchies in Grass Shrimp		
11:20 AM **Hassaan Naveed**	Psychology	Dr. Sarah Johnson
An Examination of Information Retrieval When Given an Intrinsic or Extrinsic Goal Orientation		
11:40 AM **Fatimah Bouri**	History & Gender Studies	Dr. Richard Anderson
Revolution Against Repression: How the Third World Women's Alliance Reoriented Social Politics in the 1970s and 1980s		

POSTER SESSION I

12:00 - 1:00 PM HUB 450		
Student(s)	Project Discipline(s)	Advisor(s)
Emily Alonge	Special Education & Social Sciences	Dr. Laurie Kahn
Barriers to Workforce Participation for Young Adults with Disabilities		
Emmanuel Bulted	Chemistry	Dr. Godfred Fianu
Catalytic Reduction of Esters via a Titanocene(III) Borohydride-Polymethylhydrosiloxane(PMHS) Reagent System		
Riley Crawford	Botany	Dr. Natasha Woods
Effects of Delayed Freshwater Flushing on Salinity-Stressed Germination in Raphanus sativus		
Anderson DeChiaro	Biology & Environmental Sciences	Dr. Daniel Proud
Exploring the Diversity of Poecilaemula (Opiliones: Laniatores: Cosmetidae): Rediagnosis of the Genus and the Description of a new Species		
Mia Espinal	Biology	Drs. Natasha Woods & Julie Zinnert
Increase in Storm Frequency as a Constraint on Woody Plant Encroachment in Coastal Grasslands		
Earianne Evangelista	Biology	Dr. Christopher Jones
The Effects of Heavy Metal Stress on Transgenerational Inheritance in Drosophila melanogaster		

POSTER SESSION I Cont'd

12:00 - 1:00 PM
HUB 450

Student(s)	Project Discipline(s)	Advisor(s)
Makayla Excell *Looking for Acetaminophen in Natural Waters*	Chemistry	Dr. Alison Holliday
Casey Foley *Using NMR to Determine the Position of Lead Binding in Thymosin Beta 4*	Biochemistry, Analytical & Environmental Chemistry	Dr. Stephen Dunham
Cale Gogel *Characterization of the mutation responsible for parthenocarpy in figs*	Genetics, Botany, & Agriculture	Dr. Christopher Jones
Liz Kameen *Beyond the Attic: Evolution of the 'Madwoman' in Literature*	English	Prof. Liz Gray
Renée Santarelli, Deborah Rabinovich, & Heather Adams *What the Hex are the Strategies to Hex*	Mathematics	Dr. Nathan Shank
Olivia Stopielo *How the Thought of an Incentive Affects Motivation*	Psychology	Dr. Sarah Johnson
Adelaide Treibley *Quantification of Lead in Tattoo Ink*	Chemistry	Dr. Alison Holliday
Ibrahim Turki *Shock Factor: How Microplastics Affect Predator Stimulus Behavior*	Animal Physiology	Dr. Sara McClelland
Jonathan Walsh, Jesus Rodriguez, & Faith Yeager *Wizard*	Mathematical Theory, Heuristics, Decision Problems, & Game Theory	Dr. Nathan Shank

ORAL SESSION II

Oral Presentations Session II Moderator – Dr. Josh Lord HUB 302			
Student(s)		Project Discipline(s)	Advisor(s)
1:30 PM	**Margie Rayne**	Environmental Science	Dr. Joshua Lord
Impact of Salinity and Predator Exposure on Shrimp Mobbing Behavior			
1:50 PM	**Andrew Hoopes**	Organizational leadership, Nonprofit Management, & Social Impact	Dr. Katie P. Desiderio
The Pawprint Project: Connecting Campus and Community Through Experiential Learning			

ORAL SESSION III

Oral Presentations Session III Moderator – Dr. Danielle Costanzo HUB 302			
Student(s)		Project Discipline(s)	Advisor(s)
3:00 PM	**Matthew Lynch**	Political Science, International Relations, Comparative Politics & Economics	Dr. Faith Okpotor
How Regime Type Impacts Foreign Policy Behavior			
3:20 PM	**Luiggi Paonessa**	European, German, & 19th Century Political History	Dr. Heikki Lempa
The True Turning Point of German Unification: Reassessing Bismarck's Strategy in the Danish War of 1864			

POSTER SESSION II

4:00 - 5:00 PM
HUB 450

Student(s)	Project Discipline	Advisor(s)
Jillian Barrows *Beginning to Find the Mechanism Behind Mobbing*	Biology	Dr. Joshua Lord
Matthew Braun *Consistency of Behavior Syndromes in Grass Shrimp*	Biology	Dr. Joshua Lord
Grant Chapman *Quantifying Delta-8-THC in Commercial Hemp Products*	Chemistry	Dr. Alison Holliday
Katherine Connelly & Yousuf Kanan *Selective Sound Suppression in an Embedded Package*	Computer Science/Embedded Systems	Dr. Jeffrey Bush
Kylie Dowd *Jumping Through Pollution: Microplastics and Their Effects on Froglet Locomotive and Exploratory Behavior*	Ecotoxicology	Dr. Sara McClelland
Tatyana Figuereo *Morphological and Phylogenomic Analysis of the Genus Cosmetus (Opiliones: Cosmetidae) Reveals a Non-Monophyletic Group*	Evolutionarily Biology & Arachnology	Dr. Daniel Proud
Emily Gamarello *Beauty and the Verdict: The Effect of Attractiveness on Juror Decision-Making*	Psychology	Drs. Magdalena Leszko & Robert Brill
Jordan Guerrier *Perceived Faculty Oversight and Fence-Sitting in Students of Color at a Predominantly White Institution*	Psychology	Dr. Sarah Johnson
Jacob Hyatt *Drosophila Recombination Mapping*	Biology/Genetics	Dr. Christopher Jones
Yousuf Kanan *Machine Learning Approach to Real-time Selective Sound Suppression*	Computer Science	Dr. Jeffrey Bush
Emily Nyce *Effects of Salinity Intrusion on the Growth of Morella cerifera in Coastal Ecosystems*	Environmental Science	Dr. Natasha Woods
Martha Olivas *Microplastics and Shifts in Behavior: How Exposure to Everyday Concentrations of Microplastics Affected Behavior in an Amphibian Model*	Biology	Dr. Sara McClelland
Kathryn Puharic *Does Group Boldness Predict Mobbing Frequency in Grass Shrimp?*	Environmental Science	Dr. Joshua Lord
Sydnie Stanton *Do Testing Aids Interfere With Students Retaining the Material?*	Psychology	Dr. Sarah Johnson

Wednesday, April 22, 2027

POSTER SESSION III

12:00 - 1:00 PM
HUB 450

Student(s)	Project Discipline	Advisor(s)
Marena Abboud *Accessible Virtual Reality Mindfulness for Healthcare Settings*	Computer Science; Rehabilitation Science/Occupational Therapy	Drs. Sara Benham & Jeffrey Bush
Bria Bartholomew *The Timing of Post-Storm Rainfall and Its Influence on the Growth and Expansion of Morella cerifera Seedlings*	Coastal Ecology & Biology	Dr. Natasha Woods
Deb Bhattacharyya, Inga Smolyansky, Mariam Meguid, & Isabella Roback *Decoding a Teaching Skeleton: Estimating Identity from Human Remains*	Skeletal Analysis	Dr. Cecilia Fox
Jaden Brown *Distribution of Arbuscular Mycorrhizal Fungi Structures in Coastal Plant Roots on Hog Island*	Plant Ecology	Dr. Natasha Woods
Genesis Euceda *Linking Personality to Power: Boldness as a Determinate in Grass Shrimp*	Behavioral Ecology & Animal Behavior	Dr. Joshua Lord
Arielle Fan, Cale Gogel, Zaria Rawles, & Kaelin Mead *Ethical Implications of Using Human Skeletal Remains*	Ethics & Skeletal Analysis	Dr. Cecilia Fox
Harrison Krauss, Alexander Mancini, & Brent Hepner *Loose Change, Tight Strategy - The Silver Dollar Game*	Mathematics	Dr. Nathan Shank
Brynne Loudenslager *A Hidden Cost of Plastic: Microplastics Are Changing How Animals Move*	Biology	Dr. Sara McClelland
Hassaan Naveed, Megan Reaman, Maria Lubbos, & Isabella Younes *Historical Context of Teaching Skeletons*	Skeletal Analysis/Osteology	Dr. Cecilia Fox
Matthew Peiffer *Selective Hydrosilylation of α,β-Unsaturated Esters Catalyzed by Titanocene(III) Borohydride*	Chemistry	Dr. Godfred Fianu
Allison Plitnick *Scaling Sustainable Practices: Evaluating Urban Farm Techniques for Broader Implementation in Cities and Townships*	Public Health	Dr. Tanu Altomare

POSTER SESSION III Cont'd

12:00 - 1:00 PM
HUB 450

Student(s)	Project Discipline	Advisor(s)
Jordan Ramos	Biology	Dr. Daniel Proud
Diagnosing Two New Genera of Cosmetidae Harvesters (Opiliones:Laniatores) from Costa Rica		
Eric VanDerSluys	Biology	Dr. Sara McClelland
A Natural Filtration System: Duckweed's Ability to Adsorb and Reduce Free-floating Microplastic Concentrations		
India Velazquez	Biology	Dr. Natasha N. Woods
Exploring the Impact of Multiple Storm Disturbances on Germination in Daucus carota		

Schedule of Creative Events

Moravian University Art Department

Senior Thesis Exhibition

April 16th - May 9th, 2026

Opening Reception: Thursday April 16, 2026 (6:00 - 8:30pm)
Closing Reception: Saturday, May 9, 2026 (12:00-2:00pm)
Payne Gallery – Hurd Campus, Moravian University
Presenting students:

Garcelle Dure
Samantha Edinger
Laney Garcia
Zoe Gonzalez
Olivia Heath
Liam Maguire
Caroline Melillo
Dina Mohamed
Emma Pecharo
Kevin Romero
Brandon Santiago
Maura Strickland
Chris Thorn

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Moravian University Department of Music

Student Concert Schedule

(See also: https://www.moravian.edu/music/concert-schedule)

Upcoming student performances:

Sunday, April 19, 2026 (4:00 PM): *Student & Community Ensemble*
Moravian University Celtic Ensemble
Alison Gillespie, director
Peter Hall – Hurd Campus, Moravian University
General Admission: $15 / Seniors & Students: $10

Sunday, April 19, 2026 (7:00 PM): *Moravian University Orchestra* featuring Concerto Competition winner, Elizabeth Hutchinson, violin
Felix Mendelssohn's Violin Concerto in e minor, Op. 64 with Theodore Kuchar, conductor
Additional works on the program are: Berlioz - "Hungarian March from The Damnation of Faust" and Dvorak Symphony No 6 in D Major, Op. 60.
Foy Concert Hall – Hurd Campus, Moravian University
General Admission: $15 / Seniors & Students: $10

Friday, April 24 and Saturday, April 25, 2026 (7:30 PM): *Moravian University Dance Concert*
Lisa Busfield, artistic director
Foy Concert Hall – Hurd Campus, Moravian University
Tickets $15.00 / Free With Moravian ID

Sunday, April 26, 2026 (4:00 PM): ***Moravian Flute Troupe, Clarinet Choir, and Guitar Ensemble***
Robin Kani, director, Flute Troupe; Elizabeth Brodt-Zimmer, director, Clarinet Choir; & John Arnold, director, Guitar Ensemble
Peter Hall – Hurd Campus, Moravian University
General Admission: $15 / Seniors & Students: $10

Sunday, April 26, 2026 (7:00 PM): ***Student Composers***
Moravian University Composers' Concert
Dr. Larry Lipkis, director
Foy Concert Hall – Hurd Campus, Moravian University
No admission charge

Monday, April 27, 2026 (7:30 PM): ***Student Ensembles***
Moravian University Brass Quintet & Trombone Ensemble
Larry Wright, & Ralph Brodt III, directors
Peter Hall – Hurd Campus, Moravian University
General Admission: $15 / Seniors & Students: $10

Friday, May 1, 2026 (7:30 PM): ***Student Recital***
Calvin Deifer, composition
Peter Hall – Hurd Campus, Moravian University
No admission charge

Saturday, May 2, 2026 (7:30 PM): ***The Bard's Passion - love songs and the premiere of Juliet's Diary***
Moravian University Choral Ensembles
Dr. Paula Zerkle, director
Foy Concert Hall – Hurd Campus, Moravian University
Spring choral concert involving newly composed pieces based on Romeo and Juliet and other Shakespeare-related works.
General Admission: $15 / Seniors & Students: $10

Previous Spring 2026 student performances:

February 21, 2026 (7:30 PM): ***Student Recital***
Karina Bernatowicz, violin
Peter Hall – Hurd Campus, Moravian University

February 27, 2026 (7:30 PM): ***Junior Recital***
Sarah Fabian, organ
Sarah will be playing the "Little" Fugue in g minor by Bach, the four-movement Suite Gothique by Léon Boëllman, and Suite for Violin & Organ by Hans-André Stamm. Michael Montero, violin, will join her for the Stamm suite.

February 28, 2026 (7:30 PM): ***Senior Recital***
Ashley Golden, clarinet
Peter Hall – Hurd Campus, Moravian University

March 1, 2026 (4:00 PM): ***Student Ensemble***
Moravian University Wind Ensemble
Dr. JoAnn Wieszczyk, director
and guests: Pennridge High School Symphonic Band, Nicholas Hall, director
Foy Concert Hall – Hurd Campus, Moravian University

March 21, 2026 (7:30 PM): ***Student Recital***
Eva Oakes, jazz piano
Foy Concert Hall – Hurd Campus, Moravian University

March 22, 2026 (4:00 PM): ***"This Recital Will Have No Encore"***
Nicholas Mancini, saxophone
Foy Concert Hall – Hurd Campus, Moravian University

March 22, 2026 (7:00 PM): ***Student Recital***
Brittany Cicchino, soprano
Peter Hall – Hurd Campus, Moravian University

March 27, 2026 (7:30 PM): ***"My Way" - Student Recital***
Amari Anaya, baritone
Peter Hall – Hurd Campus, Moravian University

March 29, 2026 (4:00 PM): ***"Senior Recital"***
Sean Riedy, piano
Peter Hall – Hurd Campus, Moravian University

March 29, 2026 (7:00 PM): ***Students in Concert***
Phi Mu Alpha Sinfonia
Foy Concert Hall – Hurd Campus, Moravian University

April 10, 2026 (7:30 PM): ***Student Ensemble***
Moravian University Wind Ensemble
Dr. JoAnn Wieszczyk, director
Foy Concert Hall – Hurd Campus, Moravian University

April 11, 2026 (4:00 PM): "50th Anniversary Concert" - ***Student & Alumni Ensemble***
Moravian University Early Music Ensembles
Dr. Larry Lipkis, director
Peter Hall – Hurd Campus, Moravian University

April 12, 2026 (1:00-5:00 PM): ***Moravian University Jazz Fest***
Jazz Combo I, Jazz Combo II, Jazz Fusion, Jazz Vocal, & BIG Band
Tony Gairo, David Roth, Paul Rostock, Lora Sherrodd, & Dr. Neil Wetzel, directors
Foy Concert Hall – Hurd Campus, Moravian University

April 12, 2026 (7:00 PM): ***Student Ensemble***
Moravian University Chamber Strings
Michael Montero, director
Peter Hall – Hurd Campus, Moravian University

April 17, 2026 (7:30 PM): ***Honors Project Presentation***
Elizabeth Hutchinson
Foy Concert Hall – Hurd Campus, Moravian University

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Moravian University Theatre Company

Spring Student Event Schedule

(See also: https://www.moravian.edu/theatre/season)

February, 2026: *Student-directed one-act plays*

No Boys Out Past Sundown

Written by Ry Kral & Directed by Joshua Jones

No Boys Out Past Sundown follows Amir who just recently turned 18. Unanswered questions of his brother's disappearance draw him into the forbidden night, breaking the key rule of his village...

Variations on the Death of Trotsky

Written by David Ives & Directed by Zach Santana

A comedy that follows the story of Leon Trotsky, who has just learned that he is going to die today. With so many possible ways that it could happen, Trotsky must face the unpredictability of his own death.

Words, Words, Words

Written by David Ives & Directed by Dylan Benbow

Words, Words, Words attempts to answer one of the greatest philosophical questions out there. If a group of monkeys are locked in a room for an infinite amount of time with a typewriter, will they be able to write Hamlet?

Life After Elvis

Written by Jason Milligan & Directed by Anna Hirsch

Life After Elvis follows Rachel as her whole world gets turned upside down because of an eccentric stranger in her home. This stranger is none other than The King, Elvis Presley!

April, 2026, *Annual Hound Show Cabaret*

Directed by student Emma Fastiggi

Featuring student actors, singers, comedians

April 18-19, 2026 (2:00 PM)

America Dreams

Directed by Jp Jordan, Written by: The Touchstone Ensemble

An interactive, theatrical carnival adventure, where each attraction takes you deeper into America's dreams. A Touchstone Theatre production in collaboration with the city of Bethlehem and Moravian University, featuring Moravian undergraduate and graduate student performers and Moravian faculty as writers, director, designers, performers and conductor.

The Bethlehem Rose Garden

Pay-What-You-Will

May 2, 2026

Juliet's Diary

adapted by Christopher Shorr from Shakespeare's Romeo and Juliet.

Music written by Christopher Shorr and Paula Zerkle. Arrangements by Paula Zerkle and Julius Sarkozy.

Featuring student Marisol Llaudes and the Moravian University choir

Moravian Hosted Undergraduate Student Conferences (2025-26):

40th Annual Student Mathematics Conference at Moravian University, February, 2026
Sponsored by the Department of Mathematics & Computer Science and the Pennsylvania Omicron (Moravian University) chapter of Pi Mu Epsilon, student members: Jocelyn Bernhard, Harrison Krauss, Alexander Mancini, Deborah Rabinovich, Michael Romero, & Krissy Wolf
https://sites.google.com/moravian.edu/studentmathematicsconference

13th Annual Moravian University Undergraduate Philosophy Conference, March 2026
Coordinated by the Moravian Philosophy Department
Dr. Austin Baker, Conference organizer
https://www.moravian.edu/philosophyconference/program

15th Undergraduate Research Conference in German Studies, March, 2026
Organizers: Prof. Margarete Lamb-Faffelberger, Lafayette College; Prof. Axel Hildebrandt, Moravian University
https://www.moravian.edu/conference-german-studies

Health Humanities Symposium, April 2026 (upcoming)
Sponsored by the Moravian Health Humanities program; co-sponsored by the Center for Inclusive Excellence; Africana Studies; Women, Gender, and Sexuality Studies, and the College of Health
To be held April 24, 2026 10am-3pm; Registration available through Thursday, April 23 (see flyer on last page of program)

Undergraduate Student Conference Presentations (2025-26):

Landmark Conference Summer Research Symposium, Elizabethtown College, July 2025

Jillian Barrows. *Finding out the Mechanism behind Mobbing*. Faculty advisor: Joshua Lord

Jesus Campos. *Ecological and Evolutionary Implications of Mobbing as an Anti-Predator Behavior*. Faculty advisor: Joshua Lord

Earianne Evangelista. *The Effects of Heavy Metal Stress on Transgenerational Inheritance in Drosophila melanogaster*. Faculty advisor: Christopher Jones

Edward Nuber. *Disruption of G-quadruplexes by 6-thioguanine*. Faculty advisor: Stephen Dunham

Consortium for Computing Sciences in Colleges - Eastern, Arcadia University, Glenside, PA, October 2025

Katherine Connelly. *Tranquilify: Selective Sound Suppression with Embedded Hardware*. Faculty advisor: Jeffrey Bush

Yousuf Kanan. *Machine Learning Approach to Real-time Selective Sound Suppression*. Faculty advisor: Jeffrey Bush

American Geophysical Union annual meeting, New Orleans, LA, December 2025

Kylie Dowd. *Where are the Westerns? Using Community Science Tools in the Discovery and Conservation of Pollinators*. Faculty advisor: Daniel N. Proud

Pennsylvania Department of Education Conference, Hershey, PA, February 2026

Emily Alonge. *"Our Kids Are So Much More Than That:" Lived experiences of meaningful employment amongst young adults with disabilities in transition programs*. Faculty advisor: Laurie G. Kahn

Benthic Ecology Meeting, Virginia Beach, VA, March 2026

Jillian Barrows. *The effects of the SSRI fluoxetine on mobbing behavior*. Faculty advisor: Joshua Lord

Laurie-Anna Bieneme. *Simulated storm stress drives differential root responses in shrubs and grasses*. Faculty advisor: Natasha N. Woods

Matthew Braun. *Consistency of behavior syndromes in grass shrimp*. Faculty advisor: Joshua Lord

Jesus Campos. *Behavioral geography: effect of boldness and location on mobbing in grass shrimp*. Faculty advisor: Joshua Lord

Mia Espinal. *Increasing storm frequency as a constraint on woody plant encroachment in coastal grasslands*. Faculty advisor: Natasha N. Woods

Makayla Excell. *Ecosystem drama: differences in fighting and mobbing between species of grass shrimp*. Faculty advisor: Joshua Lord
Emily Nyce. *Post-storm rainfall timing alters canopy development in Morella cerifera seedlings*. Faculty advisor: Natasha N. Woods

Kathryn Puharic. *Does group boldness predict mobbing frequency in grass shrimp*. Faculty advisor: Joshua Lord

Margie Rayne. *Impact of salinity and predator exposure on shrimp mobbing behavior*. Faculty advisor: Joshua Lord

Association of Southeastern Biologists Meeting, Mobile, AL, March 2026

Bria Bartholomew. *Delayed rainfall following storm events reduces shrub survival in coastal grasslands*. Faculty advisors: Natasha N. Woods

Mia Espinal. *Repeated storm disturbance limits growth of Morella cerifera in coastal grasslands*. Faculty advisors: Natasha N. Woods

Undergraduate Research at the Capitol Pennsylvania Poster Conference, Harrisburg, PA, March 2026

Jesus Campos. *Behavioral geography: anti-predator mobbing and social hierarchies in grass shrimp*. Faculty advisors: Joshua Lord

Pennsylvania Political Science Association Annual Conference, Kutztown, PA, March 2026

Matthew Lynch. *Regime Type and Determinants of Foreign Policy Behavior*. Faculty advisors: Faith I. Okpotor

Moravian University Undergraduate Philosophy Conference, Bethlehem, PA, March 2026

Charles Carson. *A Defense of Active Euthanasia: Killing, Letting Die, and the Right to Dignified Death.*

Sean Heissler. *Pleasure vs. Reality*.

Alexander LaBar. *From Label to Lived Reality: Inductive Risk and Ian Hacking's Looping Effects in Misdiagnosed Mental Illness*.

Onyxx Montalvo. *Marr's Levels of Explanation and Free Will*.

Louis Spann. *The Relationship Between Epistemic Bubbles, Echo Chambers, and Social Contagion.*

National Student Nursing Association Convention, Houston, TX, April 2026

Meghan Myers. *University Students' Awareness of Iron Deficiency and the Maternal-Fetal Impacts Throughout Preg*. Faculty advisor: John C. Mikovits

National Conference on Undergraduate Research, Richmond, VA, April 2026

Anderson DeChiaro. *Investigating a Clade of Pied Harvesters (Opiliones: Cosmetidae) from Costa Rica*. Faculty advisor: Dr. Daniel Proud

Mia Espinal. *Increase in Storm Frequency Impact on Morella cerifera Growth and Survival*. Faculty advisor: Dr. Natasha Woods.

Elina Georges. *Rapid Screening of Dirhodium Complexes for Biomolecule Binding*. Faculty advisor: Dr. Shari Dunham

Joshua Ramos. *Bridging the Gap between Perception and Practice: Analyzing Nurses' Roles in Evidence-Based Chronic Pain Management*. Faculty advisor: Dr. Jacqueline Gannon

Johanna Zimmerli. *Extraction and Quantification of Fluoxetine (Prozac) in the Aqueous Environment*. Faculty advisor: Dr. Alison Holliday

Lehigh Valley Ecology and Evolution Symposium, Allentown, PA, April 2026

Laurie-Anna Bieneme. *Simulated storm stress drives differential root responses in shrubs and grasses*. Faculty advisor: Natasha N. Woods

Matthew Braun. *Consistency of behavior syndromes in grass shrimp*. Faculty advisor: Joshua Lord

Anderson DeChiaro. *Exploring the Diversity of Poecilaemula (Opiliones: Laniatores: Cosmetidae): Rediagnosis of the Genus with the Description of a New Species*. Faculty advisor: Daniel N. Proud

Mia Espinal. *Repeated storm disturbance limits growth of Morella cerifera in coastal grasslands*. Faculty advisor: Natasha N. Woods

Tatyana Figuereo. *Morphological and Phylogenomic Analysis of the Genus Cosmetus (Opiliones: Cosmetidae) Reveals a Non-Monophyletic Group*. Faculty advisor: Daniel N. Proud

Jordan Ramos. *Diagnosing Two New Genera of Cosmetidae Harvesters (Opiliones: Laniatores) from Costa Rica*. Faculty advisor: Daniel N. Proud

Health Humanities Symposium, Moravian University, Bethlehem, PA, April 2026

Ryan Hausknecht, Kamoura Cousar, Serena Elsasser, & Mayzi Edelheiser. Art and Literature Panelists: *The Body Speaks: Stories of Care, Silence, and Representation.*

Aubrey Reed, Fatimah Bouri, & Hope Sostarecz. History and Religion Panelists: *Buddhist Healing, Historical Legacies, and Ethical Care.*

Annual Meeting of the American Arachnological Society, Lincoln, NE, July 2026

Anderson DeChiaro. *Exploring the Diversity of Poecilaemula (Opiliones: Laniatores: Cosmetidae): Rediagnosis of the Genus with the Description of a New Species*. Faculty advisor: Daniel N. Proud

Jordan Ramos. *Diagnosing Two New Genera of Cosmetidae Harvesters (Opiliones: Laniatores) from Costa Rica*. Faculty advisor: Daniel N. Proud

Ecological Society of America, Baltimore, MD, August 2026

Bria Bartholomew. *The role of salinity and burial in woody plant encroachment in coastal ecosystems*. Faculty advisor: Natasha N. Woods

Mia Espinal. *Evaluating microhabitat conditions favoring shrub encroachment in coastal grasslands*. Faculty advisor: Natasha N. Woods

Makayla Excell. *Showdowns in the saltmarsh: investigating grass shrimp predator responses*. Faculty advisor: Joshua Lord

Students–interested in seeing some graduate level research?

Come to the College of Health

2026 Graduate Research Symposium and Clinical Appreciation Event

On **May 6th at 6pm in the Sports Medicine and Rehabilitation Center (SMRC)**, the College of Health is hosting our annual Graduate Research Symposium and Clinical Appreciation Event. There will be poster presentations by graduating students of the Master of Science in Athletic Training, Master of Science in Clinical Counseling, Master of Science in Nursing, Master of Science in Occupational Therapy, Master of Science in Speech-Language Pathology, Master of Social Work, and Post Professional Occupational Therapy Doctorate. Community partners of the college will be recognized during an award ceremony.

6:00 pm - Welcome / Meet & Greet in Lobby and in the downstairs (appetizers and drinks for attendees)
6:10 pm - Poster Presentation I
6:40 pm - Poster Presentation II
7:10 pm - Clinical Education Awards in Lobby
7:35 pm - Poster Presentation III
8:05 pm - Poster Presentation IV
8:30 pm - Closing

Honors 2025-2026

Spring 2025-Fall 2025 (Projects completed)

Student	Discipline Area for Honors	Faculty Advisor(s)
Mary Jane Granito	Speech-Language Pathology	Dr. Monica Kaniamattam
"I would have never been the person who I am:" Exploring Lived Experiences of an Immigrant Man with Congenital Bilateral Sensorineural Hearing Loss		
Santoshi Mutyala	Computer Science	Dr. Jeffrey Bush
A Real-Time Approach to Selective Sound Suppression for Auditory Processing Disorder Treatment		
Nathan Pynchon	History	Dr. Jane Berger
A Steel Trap: Discipline & Welfare Capitalism in the Bethlehem Steel Corporation, 1910–1920		
Joan Thierry	History	Dr. Sandy Bardsley
Missing Existences: Gender Minorities in Medieval and Early Modern Europe		
Kristian Wolf	Mathematics	Dr. Shannon Talbott
The Singular k-fold Pebbling Number Across Different Graphs		

Fall 2025-Spring 2026 (Projects will be completed by the end of Spring 2026)

Student	Discipline Area for Honors	Faculty Advisor(s)
Tamarah Abdullatif	Philosophy	Dr. Arash Naraghi
Happiness in Business		
Bria Bartholomew	Biology	Dr. Natasha Woods
The Timing of Post-Storm Rainfall and Its Influence on the Growth and Expansion of Morella cerifera Seedlings		
Fatimah Bouri	History	Dr. Richard Anderson
Feminism and Sexuality in the Margins: The Historical Impact of Feminist Movements for Women of Color in the 1970s and 1980s		
Emmanuel Bulted	Chemistry	Dr. Godfred Fianu
A Study on the Hydrosilylation of Carboxylic Acid Derivatives with a Cp_2TiBH_4-PMHS System		
Samantha Edinger	Graphic and Interactive Design & Psychology	Profs. Camille Murphy & Sarah Johnson
Judging Books By Covers: What Draws Attention and Intrigues Us About the Art on What We Read		
Mia Espinal	Biology	Dr. Natasha Woods
Determining the Effect of Frequent Storms On Mycorrhizal Fungi in Morella cerifera		
Elina Georges	Biochemistry	Dr. Shari Dunham
Rapid Screening of Dirhodium Complex for Biomolecule Binding		

Connor Griffon	Nursing	Dr. Elise Colancecco

Social Media's Impact on College Students' Healthcare

Elizabeth Hutchinson	Music	Dr. Larry Lipkis

Lost Melodies: Tracing the Lives of Female Musicians in Auschwitz

Liz Kameen	English	Prof. Liz Gray

Beyond the Attic: Evolution of the 'Madwoman in Literature'

Rachel Kindt	Nursing	Dr. Elise Colancecco

The Implications of Prediabetes in the Pediatric Population

Meghan Myers	Nursing	Dr. John Mikovits

The Nurse's Role in Caring for Pregnant Patients with Iron Deficiency Anemia

Edward Nuber	Biochemistry	Dr. Stephen Dunham

Disruption of G-quadruplexes by 6-Thioguanine

Joshua Ramos	Nursing	Dr. Jacqueline Gannon

Transforming Chronic Pain Care: Aligning Nurse Perceptions with Evidence-Based Interventions to Optimize Patient Outcomes and Limiting the Use of Opioids

Sean Riedy	Music Theory & German Studies	Drs. Larry Lipkis & Axel Hildebrandt

Alexander Scriabin and the Early Soviet Musical Avant-Garde

Sean Superka	Accounting	Drs. Mark Koscinski & Daniel O'Connor

The Black Budget and the Pentagon Audit Failures: Where the Money Disappears

Adelaide Treibley	Chemistry	Dr. Alison Holliday

The Determination of Metals in Multiple Colors of Tattoo Ink

Johanna Zimmerli	Chemistry	Dr. Alison Holliday

Extraction and Quantification of Fluoxetine (Prozac) in Seawater

SOAR Projects 2025-2026

Summer 2025

Accessible Virtual Reality Mindfulness for Healthcare Settings
Marena Abboud & Dr. Sara Benham

Barriers to Workforce Participation for Young Adults with Disabilities: Exploring Prevalent Barriers to Sustainable Employment Through the Framework of Disability Studies
Emily Alonge & Dr. Laurie Kahn

Neurotransmitter Modulation of Aggressive Antipredator Behavior in Shrimp
Jillian Barrows & Dr. Josh Lord

Ecological and Evolutionary Implications of Mobbing as an Anti-Predator Behavior
Jesus Campos & Dr. Josh Lord

Analysis of Cannabinoids in Hemp Products
Grant Chapman & Dr. Alison Holliday

Tranquilify: Selective Sound Suppression in an Embedded Package
Katherine Connelly, Yousuf Kanan & Dr. Jeff Bush

Investigating a Clade of Pied Harvesters (Opiliones: Cosmetidae) from Costa Rica
Anderson DeChiaro & Dr. Dan Proud

The Effects of Heavy Metal Stress on Transgenerational Inheritance in Drosophila melanogaster
Earianne Evangelista & Dr. Chris Jones

Applying Marr's Levels of Analysis to the Connection Between Readiness Potential and Free Will
Onyxx Montalvo & Dr. Austin Baker

Invisible Invaders: Effects of Microplastics on Frog Mobility and Senses
Martha Olivas & Dr. Sara McClelland

Scaling Sustainable Practices: Evaluating Urban Farm Techniques for Broader Implementation in Cities and Townships
Allison Plitnick & Dr. Tanu Altomare

ABSTRACTS

Student Oral Presentations I

Title: **Behavioral Geography: Anti-Predator Mobbing and Social Hierarchies in Grass Shrimp**
Student(s): Jesus Campos
Advisor(s): Dr. Joshua Lord

Mobbing is an anti-predator behavior in which animals actively approach and harass predators rather than avoiding them. While commonly observed in birds, mobbing has rarely been documented in marine invertebrates. However, grass shrimp routinely approach and harass their predators. We examined mobbing behavior and dominance in Palaemon pugio and Palaemon vulgaris collected from North Carolina, South Carolina, Virginia, New Jersey, and Georgia. Laboratory experiments were designed to measure both their interactions with predators and their social behaviors with each other. These experiments allowed us to determine whether mobbing in grass shrimp is linked to dominance and whether it varies among geographic locations. Video recordings were used to quantify dominance interactions and mobbing frequency, allowing comparisons between species and among regions. Individually tagged shrimp were observed in group trials followed by the introduction of a blue crab predator. Our results show that both grass shrimp species exhibit mobbing behavior and form dominance hierarchies, although the frequencies of these behaviors vary by species and collection site. However, mobbing was not correlated with dominance rank, suggesting that these two “aggressive” behaviors are not linked.

Title: **An Examination of Information Retrieval When Given an Intrinsic or Extrinsic Goal Orientation**
Student(s): Hassaan Naveed
Advisor(s): Dr. Sarah Johnson

This study investigated the impact of intrinsic versus extrinsic goal orientation on student performance in information retrieval, while also evaluating the reliability of AI as an objective grader. Thirteen college students were divided into groups based on their motivation type: extrinsic (extracurricular incentives) or intrinsic (personal improvement). Assessment included a multiple-choice test and a free-response question, the latter scored independently by a human and Google Gemini AI. Results from an independent-samples t-test showed no statistically significant difference in multiple-choice performance between the two groups ($t(11)=-0.878$, $p>0.05$). However, a Pearson correlation revealed a significant positive relationship ($r=0.589$, $p<0.05$) between human and AI scoring. Notably, behavioral observations indicated that the extrinsic group attempted to cheat, whereas the intrinsic group did not. While the hypothesis that extrinsic motivation would lead to higher performance was not supported, the findings suggest that extrinsic goals may encourage an "any-means-necessary" approach to achievement. Furthermore, the study concludes that while AI can approximate human grading patterns, its logic remains limited by the inherent biases of its training data.

Title: **Revolution Against Repression: How the Third World Women's Alliance Reoriented Social Politics in the 1970s and 1980s.**
Student(s): Fatimah Bouri
Advisor(s): Dr. Richard Anderson

Third World Women’s Alliance (TWWA) was an organization that noted differences between racial and ethnic groups of women while acknowledging the common enemy in racism, sexism, and imperialism. Its first chapter was established in New York City in 1970, followed by its Seattle and San Francisco Bay Area chapters in 1971. This organization spawned from the Black Women’s Caucus, a branch of the Student Nonviolent Coordinating Committee (SNCC) and the Black Women’s Liberation Committee (BWLC), after the 1970 Women’s March for Equality in New York. The TWWA sought broader outreach by including men of color and lower-class white women, adopting a reconciliatory approach to justice that encompassed everyone. The women of TWWA stood in solidarity with men, allowing men of color to participate and develop as allies. In my honors thesis, I explore how the TWWA handled reproductive justice, such as sex education and medical racism, and action against state oppression/U.S. internal colony through support for political prisoners such as Angela Davis and Lolita Lebron, and compare their activism to how we handle those issues today.

Student Oral Presentations II

Title: **Impact of Salinity and Predator Exposure on Shrimp Mobbing Behavior**
Student(s): Margie Rayne
Advisor(s): Dr. Joshua Lord

Recent research established that grass shrimp (Palaemon pugio) mob blue crabs (Callinectes sapidus), but the impact of environmental conditions on this behavior is unknown. Grass shrimp are common in estuaries in eastern North America, where they play an important role consuming organic material and are consumed by fish and blue crabs. Because mobbing (intentional approach of predators) is rare in invertebrates, it is important to determine how it could be affected by environmental factors like salinity or predator exposure. We examined whether salinity (10 vs. 25 psu) and prior predator exposure (3-week crab exposure vs. none) influenced mobbing frequency using a factorial design with shrimp divided into four treatment groups. We found that salinity had a modest effect on mobbing, likely because they experience wide natural swings in salinity. The impact of crab exposure on mobbing was marginal, but exposure over a longer period might have more of an impact. Overall, it appears that mobbing is a context-specific behavior that happens in a variety of settings and conditions but varies in frequency depending on environmental factors.

Title: **The Pawprint Project: Connecting Campus and Community Through Experiential Learning**
Student(s): Andrew Hoopes
Advisor(s): Dr. Katie P. Desiderio

The Pawprint Project is a student-led initiative that gives me the chance to learn through doing. The project was developed to address a real community need: supporting families impacted by pediatric cancer. In collaboration with the Pediatric Cancer Foundation of the Lehigh Valley (PCFLV), The Pawprint Project mobilizes campus resources, engages over 100 students, community members, and campus partners, and has raised over $4,000 to date. This project goes beyond the typical student organization experience. It encourages reflection on leadership, decision-making, and the responsibilities that come with serving a vulnerable population. Through planning events, coordinating volunteers, and building partnerships, I am learning not only to organize and lead, but also to listen, adapt, and carefully consider the impact of each action. In this presentation, I will reflect on the journey of building The Pawprint Project, including the challenges, unexpected moments, and lessons I have learned about leadership, teamwork, and making a meaningful impact. It has shown me how much growth can come from doing, listening, and adapting, and how connecting with others, both on campus and in the community, shapes not only the project but also who I am as a leader and a person..

Student Oral Presentations III

Title: **How Regime Type Impacts Foreign Policy Behavior**
Student(s): Matthew Lynch
Advisor(s): Dr. Faith Okpotor

This research examines how regime type influences foreign policy behavior, focusing on the differences between democratic and authoritarian systems. It argues that regime type significantly shapes foreign policy through variations in institutional constraints, leadership accountability, and domestic political incentives. Democracies tend to promote transparency, alliance-building, and institutional cooperation, while authoritarian regimes prioritize centralized decision-making, regime survival, and strategic flexibility. Drawing on key theoretical frameworks such as the Democratic Peace Theory and realist perspectives, this study explores how internal political structures influence external state behavior. Through a comparative analysis, the paper evaluates how democracies and authoritarian regimes differ in their approaches to cooperation, conflict, and economic engagement. While democracies are more likely to engage in long-term alliances and transparent decision-making, authoritarian systems often rely on coercive strategies and selective cooperation. However, the findings also emphasize that regime type alone does not fully determine foreign policy outcomes, as strategic interests and power dynamics play a critical role. Overall, this research highlights the importance of domestic political structures in shaping patterns of international cooperation and conflict.

Title: **The True Turning Point of German Unification: Reassessing Bismarck's Strategy in the Danish War of 1864**
Student(s): Luiggi Paonessa
Advisor(s): Dr. Heikki Lempa

This project reexamines the unification of Germany by arguing that the Danish War of 1864, rather than the Austro-Prussian War of 1866 or the Franco-Prussian War of 1870–71, represents the true turning point in Otto von Bismarck's strategy. While traditional historiography emphasizes the later conflicts as decisive moments, this study demonstrates that the foundations of unification were established earlier through Bismarck's diplomatic and political maneuvering during the Danish crisis. Drawing on primary sources such as the Holstein Papers, Bismarck's correspondence, and contemporary accounts, this research highlights how Bismarck isolated Denmark, secured Austrian cooperation, and avoided intervention from other European powers. The joint administration of Schleswig and Holstein following the war created tensions that directly led to the conflict with Austria in 1866. By reassessing the significance of 1864, this project challenges conventional narratives and presents a more nuanced understanding of Bismarck's role in German unification.

Student Poster Presentations I

Title: **Barriers to Workforce Participation for Young Adults with Disabilities**
Student(s): Emily Alonge
Advisor(s): Dr. Laurie Kahn

This research poster examines the barriers young adults with disabilities face in accessing and maintaining meaningful employment. Using the frameworks of Disability Studies and the Social Model of Disability, the study examines how societal structures, systemic factors, and institutional practices contribute to employment disparities. Through in-depth qualitative interviews with young adults with disabilities, their families, and local employment organizations, the project identifies key challenges and effective supports that promote equitable workforce participation. The study also explores participants' experiences navigating employment systems, workplace accommodations, and career development programs, highlighting both obstacles and strategies that enhance inclusion. Findings aim to inform local organizations, educators, and policymakers, contributing to the development of more inclusive employment practices, transition programs, and person-centered supports. Attendees of the poster session will gain a deeper understanding of the structural and social barriers affecting employment outcomes for young adults with disabilities, as well as practical insights into strategies and resources that can foster equitable, meaningful employment opportunities within the community.

Title: **Catalytic Reduction of Esters via a Titanocene(III) Borohydride-Polymethylhydrosiloxane(PMHS) Reagent System**
Student(s): Emmanuel Bulted
Advisor(s): Dr. Godfred Fianu

Titanocene(III) complexes are versatile reagents that have been used to mediate single and two-electron catalysis. This study investigates the versatility of the titanocene(III) borohydride-PMHS reagent system in the hydrosilylation of various esters and seeks to refine the current reduction protocol. A variety of esters were successfully reduced with yields ranging from 43% to 99% with catalytic amounts of titanocene(III) borohydride, along with stoichiometric amounts of poly(methylhydrosiloxane) (PMHS). It was observed that some substrates require the addition of isopropanol for the reduction to proceed. To better understand the mechanism of reduction, WebMO, a computational chemistry interface, was used to model some esters. Ester reductions are fundamental transformations in organic synthesis. As a result, this hydrosilylation protocol provides an alternative method for reducing esters in an efficient and environmentally friendly manner.

Title: **Effects of Delayed Freshwater Flushing on Salinity-Stressed Germination in Raphanus sativus**
Student(s): Riley Crawford
Advisor(s): Dr. Natasha Woods

Salinity stress has significant negative effects on seed germination, particularly for crop species that lack adaptations for saline conditions. When flushed with freshwater, crops may be able to germinate after a salinity inundation. Delays in freshwater flushing were the parameters determining germination kinetics of Raphanus sativus (Cherry Belle radish). I predict that prolonged exposure to high salinity will decrease the germination rate. Seeds were exposed to 100 ml of saline solution (40ppt) in a 12.7 cm x 12.7 cm x 7.6 cm container and flushed with freshwater after 2, 3, or 4 days for the treatment groups. These treatment groups were compared to a no saline control group. There were five replicates of ten seeds per treatment group. Germination decreased in the treatment groups relative to the control, the longer the delay in freshwater flushing, the fewer seeds germinated. Seeds that experienced a two or three day delay had higher germination than a four day delay. Results indicate that R. sativus is moderately tolerant to enhanced salinity during germination, and length of time to freshwater exposure is a factor that affects germination rates. Early post-saline flushing improves germination by assisting plants in reducing osmotic pressure at crucial early stages of development.

Title: **Exploring the Diversity of Poecilaemula (Opiliones: Laniatores: Cosmetidae): Rediagnosis of the Genus and the Description of a New Species**
Student(s): Anderson DeChiaro
Advisor(s): Dr. Daniel Proud

The main objective of this project was to get molecular data, to study a new species of Opilione from Costa Rica and to revise the diagnosis of the genus. This was done by doing multiple lab techniques to extract Dna from leg tissues, then fragment it and sequence it. In total as a group we did 96 specimens, so it can construct a prepared library for bioinformatic analysis. A part of this was taking high resolution photos that were taken under a microscope. With those photos, they were taken into the software Fiji, to make accurate measurements for analysis.

Title: **Increase in Storm Frequency as a Constraint on Woody Plant Encroachment in Coastal Grasslands**
Student(s): Mia Espinal
Advisor(s): Dr. Natasha Woods & Dr. Julie Zinnert

Morella cerifera is an evergreen shrub. It is a moderately salt-tolerant species encroaching into grasslands dominated by the salt tolerant grass, Spartina patens, on Hog Island, Virginia. Morella cerifera can grow from a seedling to an enclosed canopy thicket in 15 years; however, it is unknown how storms, which are predicted to increase in frequency, will impact its growth. To determine the impact of an increased frequency of storms on the growth of Morella cerifera an experiment was set up with twenty-four pots containing one Morella cerifera seedling and three plugs of Spartina patens. There were four groups: no disturbance, one storm disturbance, two storm disturbances, and three storm disturbances. Treatment groups were exposed to 30 ppt saline solution simulating saltwater inundation after a storm. As disturbance events increased, Morella cerifera experienced less growth, with a 50% decrease in growth after two disturbances relative to the control. In contrast, Spartina's growth only decreased by 14% relative to the control after two disturbances. This is an indication that an increase in storm frequency has a greater impact on the growth of Morella cerifera and may reduce its capacity to encroach into grasslands, while Spartina may continue to persist.

Title: **The Effects of Heavy Metal Stress on Transgenerational Inheritance in Drosophila melanogaster**
Student(s): Earianne Evangelista
Advisor(s): Dr. Christopher Jones

Some heritable differences aren’t caused by DNA sequence changes, this is called epigenetics. “Transgenerational inheritance” refers to altered traits passed down without direct exposure. My experiment studied using Drosophila melanogaster (fruit flies) by exposing two wild-type and three seizure-prone lines (tko, jus, bas) to cadmium, copper, or

hexavalent chromium. G0 flies showed wing defects: curled, wrinkled, notched wings with damaged veins. This was shown especially in wild-type lines. Seizure-prone lines showed few defects. Later generations, unexposed to metals, still showed abnormalities. These results support transgenerational inheritance of wing defects. The weaker response in seizure lines and potential seizure effects are under investigation.

Title: **Looking for Acetaminophen in Natural Waters**
Student(s): Makayla Excell
Advisor(s): Dr. Alison Holliday

Pharmaceuticals in water systems have become an increasing concern due to the potential harm they could have on both environmental and human health. Medications like acetaminophen are widely used, and small amounts can enter water sources through wastewater, making it important to understand whether these medications remain even after water treatment. The purpose of this research is to determine if acetaminophen can be detected in local water samples. This was done through solid phase extraction (SPE) to isolate the compounds from the water, followed by liquid chromatography-mass spectrometry (LCMS) to identify and analyze the compounds. Multiple challenges were expected throughout this process, including sample preparation, possible contamination, and the chance of very low concentrations. Despite these challenges, preliminary results show that acetaminophen can be detected in water samples using these methods. These findings suggest that the techniques are effective and could be used for further research on pharmaceuticals in water systems.

Title: **Using NMR to Determine the Position of Lead Binding in Thymosin Beta 4**
Student(s): Casey Foley
Advisor(s): Dr. Stephen Dunham

Thymosin β4 peptide has been identified as a potential candidate for lead binding based upon its ability to bind to other metals and having been identified in previous post mortem experiments involving the human kidney. This study will use 2-Dimensional Nuclear Magnetic Resonance spectroscopy to identify a possible binding site for the Pb^{2+} ion.

Title: **Characterization of the Mutation Responsible for Parthenocarpy in Figs**
Student(s): Cale Gogel
Advisor(s): Dr. Christopher Jones

Parthenocarpy is the biological phenomenon whereby plants are able to produce fruit without fertilization or seeds. This improves yields and climate dependency, and has resulted in seedless cultivars of many important agricultural crops, such as bananas, eggplants, and the fig Ficus carica. Parthenocarpy can result from genetic mutations, but researchers are only beginning to identify and understand the specific changes that result in such cultivars. The goal of this independent research project will be to use genomic sequencing and comparison to identify (at least) candidates for the responsible mutation(s) by comparing the genomes of parthenocarpic and nonparthenocarpic plants.

Title: **Beyond the Attic: Evolution of the 'Madwoman' in Literature**
Student(s): Liz Kameen
Advisor(s): Prof. Liz Gray

In this paper, I examine how the "madwoman" trope in literature, where female characters are labeled as insane or hysterical for resisting social norms, both reflects and challenges prevailing cultural attitudes about women's mental health, rebellion, and agency. By comparing canonical works like Charlotte Brontë's Jane Eyre (specifically focusing on the character of Bertha Mason) to a modern retellings such as Jean Rhys's Wide Sargasso Sea, or other novels such as My Year of Rest and Relaxation by Ottessa Moshfegh and The Awakening by Kate Chopin, I demonstrate how these portrayals have evolved over time and how contemporary interpretations reclaim or complicate earlier narratives. I also

reference studies and critical examinations, such as Lisa Appignanesi's Mad, Bad, and Sad: A History of Women and the Mind Doctors, to contextualize shifting perspectives on female mental health and societal expectations. In doing so, I use a combination of literary analysis, historical contextualization, and theoretical approaches (including feminist, psychoanalytic, and postcolonial frameworks) to show that depictions of so-called "mad" or "difficult" women critique patriarchal structures. By examining how and why these women are silenced, stigmatized, or pathologized, my project illustrates the broader social implications of labeling defiant female characters as "mad."

Title: **What the Hex are the Strategies to Hex**
Student(s): Renée Santarelli, Deborah Rabinovich, & Heather Adams
Advisor(s): Dr. Nathan Shank

The game of Hex is a combinatorial strategy game, traditionally played by two players on a 11x11 rhombus-shaped board consisting of hexagonal cells. The players take turns trying to connect their two opposite sides of the board with their color of hexagon placed one at a time. A key property of Hex, under optimal play, is that it never ends in a tie because Player 1 has a guaranteed path across the board. Studying boards of size 3x3 and larger, we have utilized the smaller size to our advantage of finding strategies such as optimal starting positions and dead cells. We compare offensive and defensive approaches, and explore several variants of Hex involving alternative board shapes, "holes" in the playing field, and modified rules.

Title: **How the Thought of an Incentive Affects Motivation**
Student(s): Olivia Stopielo
Advisor(s): Dr. Sarah Johnson

The relationship between incentives and motivation is complex, as some suggest that the anticipation of a reward, known as incentive salience, may be what is the real driving factor rather than actually receiving the reward. This research was conducted to look at the motivational impact of the lead-up to the retrieval of an incentive, using the incentive caffeine. Specifically, it was hypothesized that those who were told they were going to receive caffeine would activate incentive salience and show an increase in motivation levels throughout their day. With the use of a pretest-posttest independent-groups design, the self-reported motivation scores of college students who were informed they would receive a caffeinated beverage (coffee, energy drink, or soda) (N=8) were compared to the control group's score, who received no information about a future incentive (N=7). Results showed that those in the experimental group showed an increase in their motivation levels throughout their day, compared to those in the control group who showed a decrease in their motivation levels throughout their day. There was a statistically significant interaction between the time of day and the incentive condition. The incentive alone and the time of day alone did not show a significant effect.

Title: **Quantification of Lead in Tattoo Ink**
Student(s): Adelaide Treibley
Advisor(s): Dr. Alison Holliday

Lead has poor effects on health, and with tattoo inks being found to contain lead, there is reason for concern. This project was intended to quantify the amount of lead in tattoo inks. Lead concentration varied significantly by color, with results ranging from 30 parts per billion (ppb) to 14,000 ppb. There was a large variation in lead between samples from the same bottle, suggesting uneven suspension of lead. Most inks had lead concentrations above the suggested safe limit of 70 ppb, and the yellow ink had significantly more lead than the suggested value.

Title: **Shock Factor: How Microplastics Affect Predator Stimulus Behavior**
Student(s): Ibrahim Turki
Advisor(s): Dr. Sara McClelland

Microplastics are one of the most common pollutants that are ubiquitous throughout the world. They enter the environment either directly through the manufacture of microplastics (primary microplastics) or as a result of larger plastics breaking down as a result of weathering, UV radiation, and physical abrasion (secondary microplastics). Environmental microplastics are known to have a negative impact on many invertebrates, fish, and even mice. This research aimed to observe the impact of microplastic exposure on amphibians. Amphibians have been used as model organisms for understanding development as well as the effects of ecological toxins in vertebrate animals, including humans. In this study, we assessed how microplastic exposure during development affected predator escape behavior in Northern Leopard Frog (Lithobates pipiens) juvenile frogs. Froglets were placed on a track and were subjected to a simulated predatory stimulus using a glass rod. Recorded metrics included the initial, maximum, average hops, and whether each froglet completed the track or ceased activity. Results indicated no significant differences between any of the tested variables. More research is needed to analyze effects on other anti-predator strategies in frogs and other animals.

Title: **Wizard**
Student(s): Jonathan Walsh, Jesus Rodriguez, & Faith Yeager
Advisor(s): Dr. Nathan Shank

This research examines bidding heuristics for a relatively new trick-taking card game Wizard, and their role in securing a first-player advantage for point accumulation. Using a python program, we analyze winning probabilities across various player counts and hand sizes. Preliminary results indicate a consistent, predictable pattern in card winning frequencies, suggesting that an optimal scoring heuristic can be modeled based on game-state variables. Current analysis focuses on exploring outlier scenarios to finalize a strategy for maximizing point gain.

Student Poster Presentations II

Title: **Beginning to Find the Mechanism Behind Mobbing**
Student(s): Jillian Barrows
Advisor(s): Dr. Joshua Lord

Grass shrimp (genus Palaemon) display unusual social behaviors including forming dominance hierarchies and mobbing predators, yet the mechanisms behind these behaviors remain poorly understood. These ecologically important crustaceans are common in eastern North American estuaries, where they are consumed by fish, birds, and blue crabs. This pilot experiment examined how the SSRI (selective serotonin reuptake inhibitor) fluoxetine affects "aggressive" behaviors in grass shrimp to begin understanding mechanisms behind mobbing and dominance fights. Mobbing occurs when prey (grass shrimp, Palaemon pugio) attack or approach their predator (juvenile blue crab, Callinectes sapidus). Because fluoxetine (Prozac's active ingredient) reduces anxiety and potentially lowers aggression in humans, SSRI exposure could reveal behavioral mechanisms in shrimp. Laboratory recordings of crab-shrimp interactions showed that fluoxetine-exposed shrimp were far less aggressive toward both crabs and conspecifics. While much remains to be explored, these results suggest overlapping neural pathways may control how shrimp interact with predators and each other, providing initial insight into the neurological basis of these complex social behaviors.

Title: **Consistency of Behavior Syndromes in Grass Shrimp**
Student(s): Matthew Braun
Advisor(s): Dr. Joshua Lord

Grass shrimp (Palaemon pugio) form dominance hierarchies and also exhibit an unusual anti-predator behavior known as mobbing, where they antagonize the predator rather than flee from it. However, we know little about the link between these traits or whether individuals show consistency in their fighting or mobbing behavior (aka “personality”). This study investigated whether mobbing and dominance behavior are consistent traits by pooling data across multi-day experiments

that examined both fighting and mobbing in tagged shrimp. Video analysis of intraspecific fighting and mobbing interactions with predators allowed for large-scale conclusions to be drawn about shrimp behavior. Results suggest that dominance hierarchies are extremely stable (over 80% stability across days) and individual mobbing behavior is also relatively constant (over 70% rank stability). Shrimp that initially exhibited high or low mobbing tendencies typically maintained similar behaviors on the second day, suggesting that this is a consistent 'personality' trait. However, there was no link between fighting/dominance and mobbing frequency, suggesting that different factors influence the likelihood of shrimp to display these two seemingly "aggressive" behaviors.

Title: **Quantifying Delta-8-THC in Commercial Hemp Products**
Student(s): Grant Chapman
Advisor(s): Dr. Alison Holliday

The Agriculture Improvement Act of 2018 modified federal law, legalizing commercial hemp. This bill stipulated that any hemp grown had to contain less than 0.3% delta-9-THC by weight (delta-9 being the most common psychoactive compound produced by the cannabis plant), but did not limit any other compounds. Because of this, hemp producers have been able to work through a loophole in an unregulated industry, synthesizing other similarly psychoactive compounds such as delta-8-THC through the use of CBD as a precursor. This study involved the quantification and comparison of reported and found values of delta-8 in commercially available hemp products, as well as an inquiry into the development of degradation products produced through heat and UV radiation.

Title: **Selective Sound Suppression in an Embedded Package**
Student(s): Katherine Connelly & Yousuf Kanan
Advisor(s): Dr. Jeffrey Bush

This project explores solutions for assistive technology to help manage misophonia and similar conditions. Misophonia, described as a complex neurophysiological and behavioral syndrome, is characterized by intensely negative emotional, physiological, and behavioral responses to common sounds like coughing, chewing, throat-clearing, and sniffling. The research and understanding of underlying mechanisms and treatments for this condition is limited, and the prevalence of triggers leads many individuals to employ avoidance mechanisms, which present issues in overall functioning. To address this, the intention is to create headphones that block all external sounds and then utilize embedded hardware and machine learning to reproduce filtered, trigger-free audio in real-time to the wearer. General concepts of this selective hearing were inspired by work from the University of Washington where they created headphones capable of focusing on specific or closer sounds while suppressing all others (Veluri et al., 2023). The real-time sound suppression system provided a strong foundation, but its focus was on minimizing general sounds for the wearer rather than sounds that may trigger misophonia. Triggers are not directly based on volume or proximity, but instead correlate with patterns, often involving human-produced sounds rather than background activity such as noise from traffic.

Title: **Jumping Through Pollution: Microplastics and Their Effects on Froglet Locomotive and Exploratory Behavior**
Student(s): Kylie Dowd
Advisor(s): Dr. Sara McClelland

Microplastics are plastics that have been broken down to between 1 (nm) nanometer and 5 (mm) millimeters in size. The impacts of these microplastics on the environment and its inhabitants are still largely unknown. It is for that reason that there is a growing concern and need for researchers to focus on what types of physiological and behavioral effects result from microplastic consumption and exposure. In the field of ecotoxicology, anurans (frogs) are often chosen as study subjects and referred to as environmental indicators, because their highly permeable skin makes them extremely sensitive to any negative pollutant that enters their habitat. In this study, tadpoles developed in tanks that had either been exposed to microplastics or that were in freshwater, alone, until they metamorphosed into frogs. Frogs were then observed for any changes in locomotive and exploratory behavior caused by exposure to microplastics during development. We found that microplastics did partially impact behavior. The results of this study reaffirm the necessity for further studies analyzing the impacts of microplastics, as they can help us understand why specific animal behaviors are changing in nature.

Title: **Morphological and Phylogenomic Analysis of the Genus Cosmetus (Opiliones: Cosmetidae) Reveals a Non-Monophyletic Group**
Student(s): Tatyana Figuereo
Advisor(s): Dr. Daniel Proud

The Cosmetidae family is a diverse group of tropical arachnids, with ongoing research into their taxonomy and evolutionary relationships. This study examined specimens using high-resolution stereomicroscope imaging to analyze key physical traits like dorsal spine morphology. Researchers compared three distinct clades to determine whether observable morphological differences correspond to evolutionary divergence. Results showed clear variation in body form and spine structure, suggesting some groups may be misclassified within the same genus. By combining morphological observations with phylogenetic data from ultra conserved elements, the study highlights the importance of integrating multiple approaches to better understand arachnid classification and biodiversity.

Title: **Beauty and the Verdict: The Effect of Attractiveness on Juror Decision-Making**
Student(s): Emily Gamarello
Advisor(s): Dr. Magdalena Leszko & Dr. Robert Brill

This study examines the influence of defendant physical attractiveness on juror decision-making across multiple case scenarios. Participants were presented with a series of cases in which defendant attractiveness was systematically varied and were asked to provide verdict decisions and attractiveness ratings. A factorial design was used to assess the effects of attractiveness across conditions. Descriptive statistics and inferential analyses were conducted to evaluate differences in verdict outcomes. Preliminary findings suggest that defendant attractiveness may impact juror judgments, indicating the presence of bias in legal decision-making. These results contribute to a broader understanding of how extralegal factors influence perceptions of guilt and highlight potential implications for fairness within the judicial process.

Title: **Perceived Faculty Oversight and Fence-Sitting in Students of Color at a Predominantly White Institution**
Student(s): Jordan Guerrier
Advisor(s): Dr. Sarah Johnson

This study examined whether students of color at a predominantly White institution would alter their survey responses when they believed faculty might review them. Thirty-eight participants completed an online Qualtrics survey with 14 slider-scale items assessing fence-sitting tendencies, belonging, institutional support, cultural representation, and campus climate, along with ten open-ended questions about their experiences. Participants were randomly assigned to either a faculty oversight condition, in which they were told faculty would review their responses, or an anonymous condition, in which no individual responses would be seen. An independent-samples t-test was conducted across eight conceptual clusters. Contrary to the two-tailed hypothesis, no significant differences emerged between conditions. However, qualitative responses revealed meaningful patterns: students reported greater honesty when surveys were anonymous, expressed concerns about judgment and misunderstanding, and described experiences of racial bias, imposter feelings, and inconsistent belonging. Many noted that comfort depended on confidentiality and feeling genuinely valued. Although the manipulation did not yield quantitative differences, the qualitative data suggest that students of color navigate complex pressures shaping self-expression. These findings highlight the need for further research on belonging, identity, and psychological safety in institutional settings.

Title: **Drosophila Recombination Mapping**
Student(s): Jacob Hyatt
Advisor(s): Dr. Christopher Jones

Mapping is an important process to be able to identify the location of specific mutations in a genome. A common method for this procedure is called recombination mapping. In my research, I conducted a semester-long experiment which involved generations of crossing fruit flies (Drosophila melanogaster) with specific mutations to then be able to perform recombination mapping to determine the location on the chromosome in which the mutation was occurring. My two mutations were newly discovered, one being on the X chromosome and one being on the third chromosome. As a result of my experiment I was able to narrow down the location of these mutations on their respective chromosomes.

Title: **Machine Learning Approach to Real-time Selective Sound Suppression**
Student(s): Yousuf Kanan
Advisor(s): Dr. Jeffrey Bush

This project aims to design and implement a real-time machine learning model that filters out specific sound triggers associated with misophonia, such as coughs and throat clearing, while allowing all other environmental sounds, such as conversations, to pass through. Traditional noise-canceling systems block entire frequency ranges or crude patterns, but using a machine learning model trained to recognize and suppress only the sounds identified as triggers. The software component of this project consists of separating sounds from the environment into multiple sources using DUET, a sound separation algorithm (Rickard, 2007). Then, running each individual sound through a machine learning model to determine whether or not the sound is a trigger. The non-trigger noises will then be reconstructed, allowing them to be played back to the user. A major challenge in this project lies in hardware limitations; for the brain to remain unaffected by lag, system latency must stay less than 50 ms due to synchronization between audio and visual stimuli (Veluri, 2023). This constraint requires balancing computational power with a compact form factor. This project is seeking to create assistive technology that improves the quality of life for those with misophonia and other auditory processing disorders.

Title: **Effects of salinity intrusion on the growth of Morella cerifera in coastal ecosystems**
Student(s): Emily Nyce
Advisor(s): Dr. Natasha Woods

Coastal areas are increasingly becoming vulnerable to seawater flooding due to the frequency and intensity of storms. Global warming not only increases storm frequency but also intensifies storms, which could disrupt natural vegetation and ecosystem dynamics. Outcomes such as sea level rise can affect low-lying terrestrial areas, including barrier islands, which act as a buffer, protecting the mainland from floods and erosion. Along the U.S. Atlantic Coast, barrier islands are breaking apart, partly because a native shrub, Morella cerifera, is spreading into grassland where Spartina patens is the dominant grass species on Hog Island, Virginia. What is relatively unknown is to what extent M. cerifera will be impacted by different levels of salt intrusion. To determine the impact of different concentrations of salt intrusion, M. cerifera seedlings were exposed to three different concentrations of salinity: 5 ppt, 15 ppt, and 30 ppt. The results show that higher levels of salt intrusion do not negatively impact the growth of M. cerifera. Morella cerifera is moderately salt-tolerant during short periods of salt intrusion; however, longer periods of salt intrusion should be the focus of future studies.

Title: **Microplastics and shifts in behavior: How exposure to everyday concentrations of microplastics affected behavior in an amphibian model**
Student(s): Martha Olivas
Advisor(s): Dr. Sara McClelland

Microplastics are plastic particles that are smaller than 5 mm in size and are widely distributed in freshwater environments. Despite their presence in our ecosystems, the biological effects of long term chronic microplastic exposure remain poorly understood. Amphibians are great indicator species; they have highly permeable skin and their aquatic life stages make them increasingly vulnerable and sensitive to environmental pollutants. This study investigated the behavioral effects of long term exposure to environmentally relevant concentrations of microplastics in tadpoles of the amphibian the Northern Leopard Frog (Lithobates pipiens). Tadpoles were exposed to either controlled conditions or microplastic treatment (1 ug/L microplastics, 34-50um particles) for approximately 4 months during development. A series of behavioral assays were then conducted to assess sensory, olfactory, visual and predatory stimulus. We found that exposure to microplastics resulted in behavioral changes. As important ecological indicators, amphibians are helping us

understand how microplastics influence animal behavior, providing insights into broader ecological consequences of plastic pollution in our water ways.

Title: **Does Group Boldness Predict Mobbing Frequency in Grass Shrimp?**
Student(s): Kathryn Puharic
Advisor(s): Dr. Joshua Lord

Boldness, or the willingness to explore and take risks, is a personality trait found in both marine and terrestrial species. Levels of boldness in an organism have been correlated with behavioral influences on species, specifically in anti-predator responses. In the grass shrimp Palaemon pugio, previous research has established that there is no link between intraspecific dominance and mobbing of predators, even though both of these behaviors would typically be considered "bold" traits. With the goal of better understanding aggression and boldness in shrimp and how they are linked to ecologically relevant behaviors, we designed and conducted boldness assays and created groups of "bold" and "passive" shrimp. We examined the behavior of these groups to determine whether "boldness" was linked to predator avoidance and mobbing behavior. We observed modest differences in shrimp antipredator behavior between the more bold and passive groups, suggesting that our assays have some ability to predict shrimp behavior. Observed differences between groups of shrimp based on their 'personality' provide some insight into how mobbing might have evolved and suggest that populations of shrimp may differ in their antipredator behavior.

Title: **Do Testing Aids Interfere With Students Retaining The Material?**
Student(s): Sydnie Stanton
Advisor(s): Dr. Sarah Johnson

The study sought to answer if allowing student's cheat sheets during exams would lead to them not retaining the material as much in preparation, assuming that they can use the cheat sheet as a crutch during the test. The experiment consisted of utilizing twelve Moravian University psychology students who were then split into two groups of six. Both groups were given a fun fact sheet to study and to create a cheat sheet about. Then, they were both tested and then retested. The control group wasn't given access to their cheat sheet during either test, and the experimental group had it during the first test only. The results exhibited no significance between the experimental group and control group, nor the first and second round of each group's tests. The sample size, short term memory usage, and surface level test material limited this study and further research could be informational.

Student Poster Presentations III

Title: **Accessible Virtual Reality Mindfulness for Healthcare Settings**
Student(s): Marena Abboud
Advisor(s): Dr. Sara Benham & Dr. Jeffrey Bush

Nearly half of hospitalized patients report pain during their stay, yet many non-pharmacological interventions remain inaccessible or cost-prohibitive. This project presents MindScape 360, a cross-platform virtual reality mindfulness application developed for patient use in healthcare settings. The app pairs immersive 360-degree nature video with guided mindfulness audio, delivered through an affordable smartphone-compatible VR headset, offering a low-cost alternative to commercial VR systems. Built using Kotlin Multiplatform and the Google Cardboard SDK, MindScape 360 runs natively on both Android and iOS from a shared codebase. The app features multiple guided mindfulness sessions categorized by content type, adaptive video caching for offline use, and a stereoscopic VR rendering pipeline using custom sphere mesh geometry and platform-specific Metal and OpenGL ES shaders. The standard smartphone is then inserted into a low-cost VR viewer headset. This project was completed as a SOAR research fellowship in collaboration with the Occupational Therapy Program at Moravian University. Usability testing with Rehabilitation Sciences participants was completed in Fall of 2025, with feasibility testing currently at the SMRC in Spring 2026.

Title: **The Timing of Post-Storm Rainfall and Its Influence on the Growth and Expansion of Morella cerifera Seedlings**
Student(s): Bria Bartholomew
Advisor(s): Dr. Natasha Woods

Many grassland ecosystems are transitioning to woody plant dominance, with potentially detrimental consequences for coastal ecosystems, including barrier islands. Storm and high wind events that increase storm surge result in high soil salinity, and in the absence of rainfall, may negatively affect plants that rely on freshwater to dilute saline conditions. On Hog Island, Virginia (Long-Term Ecological Research site), the evergreen shrub Morella cerifera is encroaching into grasslands dominated by Spartina patens with consequences for ecosystem function. This study examined the effects of a simulated storm event followed by freshwater flushing at varying intervals on shrub and grass seedlings that are found in areas behind the dune (i.e. swale) on barrier islands. Pots containing one M. cerifera seedling surrounded by three S. patens plugs were exposed to a 30 ppt salinity pulse and flushed with freshwater after 2, 3, or 4 days, or not flushed. Plants recovered under controlled, field-simulated conditions for eight weeks. Salinity significantly reduced M. cerifera growth and survival when freshwater flushing was delayed by 3 or 4 days or absent; only 40% of shrubs survived without flushing. In contrast, S. patens exhibited 100% survival across treatments, though height and stem growth declined with longer flushing delays.

Title: **Decoding a Teaching Skeleton: Estimating Identity from Human Remains**
Student(s): Deb Bhattacharyya, Inga Smolyansky, Mariam Meguid, & Isabella Roback
Advisor(s): Dr. Cecilia Fox

In October of 2023, a human teaching skeleton was found in a locker on Moravian University's south campus. Its origin was unknown. As part of our Skeletal Analysis Course (BIOL 349), we spent the semester learning how to create a biological profile that could aid in identifying the skeleton through estimation of sex, age at death, ancestry and stature. Conventional forensic anthropology techniques were used in creating the biological profile. Characteristics of the skeleton's pelvis and skull were used in estimating sex, whereas age at death was estimated using dental wear and development. Estimating ancestry was carried out using cranial features, whereas stature was estimated using long bone measurements. Tape measures and calipers were used to retrieve accurate measurements from various parts of the skeleton. Results indicated gender and age which helped form the rest of the biological profile. Estimating stature was carried out through detailed measurements of the long bones. However, age at death and ancestry could not be determined with any degree of confidence. These findings provide a first step toward identifying the details of this human specimen, a process that we learned must be guided by ethical principles to ensure dignity, privacy, and responsible use of the information.

Title: **Distribution of Arbuscular Mycorrhizal Fungi Structures in Coastal Plant Roots on Hog Island**
Student(s): Jaden Brown
Advisor(s): Dr. Natasha Woods

In coastal and other low nutrient environments it is essential that plants form symbiotic relationships with arbuscular mycorrhizal fungi. AMF drastically increases plant nutrient uptake by utilizing different structures such as vesicles, hyphae, and arbuscules. The extent to which coastal plant roots found on Hog Island are colonized by these different forms of AMF is unclear as well as the proportion of these different forms of AMF in roots. The current research is preliminary for understanding how the different forms of AMF are quantified on roots. Roots were first cleared in 10% KOH, then stained with Pelican Blue ink®, and examined under a compound microscope. A 10 cm transect was marked on each root, and the presence of AMF structures was recorded at 1 mm intervals along the transect. This study showed that all three forms of AMF were present on the coastal plants used in this study; however, vesicles were the most prevalent form of AMF. Further studies should examine variation in AMF colonization amongst different species of coastal plants and environmental conditions.

Title: **Linking Personality to Power: Boldness as a Determinate in Grass Shrimp**
Student(s): Genesis Euceda
Advisor(s): Dr. Joshua Lord

Boldness, a willingness to explore, is a personality trait in many species but has rarely been assessed in marine vertebrates. Previous research has shown that dominance hierarchies form, influencing access to shelters and resources, however it isn't known whether these ranks are influenced by boldness. This study aimed to determine whether individual boldness can predict outcomes in dominance hierarchies. The bolder and more risk-taking individuals, such as Palaemon vulgaris, will show a higher chance of achieving higher dominance ranks. To assess boldness, a 15-minute acclimation period was provided for the control experiment, followed by a 15-minute observation period to observe shrimp behavior, which was stimulated in an environment that encouraged boldness. These trials were repeated to evaluate the consistency in behavior over time. We found that the shrimp that showed more "boldness" didn't show a significant relationship with dominance in hierarchies. This suggests that boldness alone may not be a strong predictor of social hierarchy in grass shrimp. This study demonstrates that while behavioral traits, such as boldness, may play a key role in shaping social structure, further research is needed to better understand the dynamics in marine invertebrates.

Title: **Ethical Implications of Using Human Skeletal Remains**
Student(s): Arielle Fan, Cale Gogel, Zaria Rawles, & Kaelin Mead
Advisor(s): Dr. Cecilia Fox

Human skeletal remains are invaluable to forensic, anthropological, and biomedical research, yet many collections have origins that are ethically problematic. In response, stricter legislative and ethical oversight has been enacted to protect donors and communities. Evaluating the impact of enforcing strict ethical guidelines—specifically Chapter 8 of the National Health Act (NHA)—on the conduct, feasibility, and quality of research involving human skeletal remains should be of paramount importance. For this project, the review and analysis of Research Ethics Committee (REC) decisions and protocol amendments before and after Chapter 8 implementation were examined. Special emphasis focused on drivers for revision, frequency and reasons for REC denial, consent and re-consent practices, and impacts on approval timelines and research outputs. Scientific concerns were the primary drivers of protocol revisions. REC denials clustered around studies addressing sensitive topics (e.g., HIV status, race, research involving children), whereas low-risk studies commonly proceeded without requiring re-consent. Across study types and time periods, informed consent persisted as the most consistent ethical and legal issue raised by committees. The introduction of Chapter 8 did not reduce the quality or volume of skeletal research; rather, it corresponded with more efficient REC approval processes and provided clearer guidance for protocol improvement. Enacting stringent ethical legislation did not impede academic progress in skeletal research. Instead, a robust legal and ethical framework enhanced research integrity, streamlined ethical review, and offered structured support for investigators to refine protocols.

Title: **Loose Change, Tight Strategy - The Silver Dollar Game**
Student(s): Harrison Krauss, Alexander Mancini, & Brent Hepner
Advisor(s): Dr. Nathan Shank

In this project, we analyze strategic outcomes in the Silver Dollar Game, a two-player game in which coins are moved left along a strip of squares until one player removes the final coin, making them the winner. We model the game using principles from combinatorial game theory, particularly Nim, to classify starting positions as a win for Player 1 or Player 2. By identifying invariant structures and mapping positions to equivalent Nim heaps, we develop a method for predicting whether Player 1 or Player 2 has a winning strategy. We further extend this analysis to varying numbers and placements of coins, and restrictions on movement distance, demonstrating how these modifications affect optimal play.

Title: **A Hidden Cost of Plastic: Microplastics Are Changing How Animals Move**
Student(s): Brynne Loudenslager
Advisor(s): Dr. Sara McClelland

Microplastics are known to cause a myriad of issues in many animals. Amphibians are excellent environmental indicators of pollution levels, as well as a model for how microplastics could affect humans, because they tend to be affected by pollutants more quickly. This is partially due to their permeable skin. Previous studies showed microplastics affect swimming behavior in fish and tadpoles. Our aim was to determine if microplastics would affect movement in frogs that had been exposed to microplastics during development. In this study, the microplastic-treated frogs showed significantly less movement than the control frogs. The microplastic-treated group also had significantly fewer jumps per minute than the control group. This shows a pattern of lethargic behavior in the microplastic-treated frogs, possibly caused by the physiological stress that microplastics cause to their bodies. The long-term physiological effects of microplastics are largely unknown. However, their abundance is steadily increasing. It is important to understand how this pollution affects model organisms so we can better preserve at-risk species and protect ourselves.

Title: **Historical Context of Teaching Skeletons**
Student(s): Hassaan Naveed, Megan Reaman, Maria Lubbos, Isabella Younes
Advisor(s): Dr. Cecilia Fox

Human skeletal remains often carry a legacy of unethical acquisition, even if used for the purpose of education. This research explores the problematic history of teaching skeletons by focusing on a 2023 discovery at Moravian University. A teaching skeleton was found on Moravian University's south campus lacking any identifying features nor proper identification. Analysis of the skeleton, including the presence of springs, wires, and distinctive drill holes, along with the context of an academic setting, confirmed the status of the skeleton as a teaching aid. Historically, many specimens were trafficked in the 19th and 20th centuries from countries in Southern Asia without the knowledge of families or respect for any cultural funeral practices. By examining the challenges faced in identifying and handling this Moravian specimen, this research aims to underscore and understand the widespread, yet often overlooked, ethical violations found when examining teaching skeletons, or any skeletal remains for that matter. Our research emphasizes the importance of acknowledging these historical injustices and confronting these unethical acquisition patterns of the past, therefore allowing academia to transition toward a more transparent and respectful approach to skeletal analysis.

Title: **Selective Hydrosilylation of α,β-Unsaturated Esters Catalyzed by Titanocene(III) Borohydride**
Student(s): Matthew Peiffer
Advisor(s): Dr. Godfred Fianu

In this study, methyl 3-cyclohexylpropan-2-oate was synthesized via a Horner–Wadsworth–Emmons reaction between trimethyl phosphonoacetate and cyclohexanecarboxaldehyde, providing access to a non-conjugated ester substrate for subsequent reactivity studies. The synthesized ester was then subjected to a titanocene-catalyzed hydrosilylation using a titanocene(III) borohydride–PMHS reduction system. Its reactivity was compared to that of methyl cinnamate, a conjugated α,β-unsaturated ester, under identical reaction conditions to evaluate the influence of alkene conjugation on reduction outcomes. The results revealed a clear divergence in reactivity between the two substrates. Methyl cinnamate underwent complete reduction of both the alkene and ester functionalities, ultimately yielding the corresponding saturated alcohol. In contrast, methyl 3-cyclohexylpropan-2-oate showed no reactivity at the alkene fraction, with the double bond remaining intact under the same conditions. These findings suggest that conjugation, particularly with an aromatic system, plays a critical role in facilitating alkene reduction in titanocene(III)-catalyzed hydrosilylation. This study highlights important considerations for the design of selective reduction protocols using titanocene-based catalytic systems.

Title: **Scaling Sustainable Practices: Evaluating Urban Farm Techniques for Broader Implementation in Cities and Townships**
Student(s): Allison Plitnick
Advisor(s): Dr. Tanu Altomare

The purpose of this research project is to evaluate several climate-positive practices at MFP in terms of cost, logistics, labor, and funding sources, and scale these practices for a larger area, such as a township, municipality, or city. The research questions posed through this project are: 1) What is involved in implementing these practices?; 2) How is climate resilience achieved through these practices?; 3) What resources would a city, such as Bethlehem or Easton, require to

implement these practices as a method to address the goals of the CAP? This assessment will be summarized in a final report, which can be used to inform stakeholders, aid in fundraising and awareness campaigns, and serve as a guide for organizations and councils who may sign on to the CAP in the future..

Title: **Diagnosing Two New Genera of Cosmetidae Harvesters (Opiliones:Laniatores) from Costa Rica**
Student(s): Jordan Ramos
Advisor(s): Dr. Daniel Proud

We used a phylogeny constructed with UCEs to identify two clades of harvesters. Only one of the species in this group, Kevonones irazus, is described by a single female holotype. Through our tree, we have found and described a male of this species. The rest of the organisms in the clade are new species in Costa Rica. We used morphological and locality data to diagnose these two clades of harvesters.

Title: **A Natural Filtration System: Duckweed's Ability to Adsorb and Reduce Free-floating Microplastic Concentrations**
Student(s): Eric VanDerSluys
Advisor(s): Dr. Sara McClelland

Microplastic pollution has become an ever-present issue within bodies of water, making it important to investigate ways to remove or mitigate the effects of microplastics. Duckweed is a common, fast-growing plant in pond ecosystems. Previous work showed that at high concentrations microplastics adhere to duckweed. Our research serves as a preliminary study on how varying microplastic concentrations are affected by varying concentrations of Duckweed. We aimed to determine if microplastics adhere to the duckweed at a more natural concentration. To do this, a 3x3 factorial design was used. Tanks contained microplastics at concentrations of 0, 1 ppb, or 1 ppm, and duckweed at concentrations of 0, 0.25g/L, and 0.5g/L. After 10 days, the Duckweed was removed, and the water was filtered to examine the microplastics that remained in the water. Duckweed clusters were observed to count the amount of microplastics that adhered to the duckweed. The filters containing microplastics from the water were also assessed for the number of microplastics. The results showed that there was adherence of the microplastics to the duckweed. In future experiments, we hope to test whether duckweed will alter the effects that microplastics have on animals that live in the water.

Title: **Exploring the Impact of Multiple Storm Disturbances on Germination in Daucus carota**
Student(s): India Velazquez
Advisor(s): Dr. Natasha N. Woods

The life cycle of a plant is a delicate process and requires many conditions to be ideal in order for it to progress through its stages of development. For plants growing in farms along the coast environmental issues such as sea level rise, stemming from climate change, pose a great threat to this growth for a large number of cultivated plants. Saltwater intrusion is known to be a significant reason for damage to farmland, and more so plant life grown in coastal communities. This experiment tested the effects of different frequencies of exposure to salinity on the crop Daucus carota, or more commonly known as the carrot, to determine if seed germination would be greatly impacted by multiple storm disturbances. Four groups of six replicates of carrots were subjected to varying frequencies of salinity disturbances and germination rates were compared to the control group. The percent germination yield was documented each week. Results showed that carrots with the highest frequency of salinity disturbances had the lowest germination yield compared to all treatment groups. Other areas of research could focus on investigating the impact of more salinity concentrations on carrots in the future.

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