WELCOME

Regional Science Consortium
20th Annual Research Symposium
November 6-8, 2024
Tom Ridge Environmental Center
at Presque Isle State Park

Welcome… to the celebration of our 20th Annual Regional Science Consortium Research Symposium. It is hard to believe it has already been 20 years… and I have attended or hosted every one of them! Each year I look forward to the Symposium, however this year I may be a little more excited than in years past. The RSC has evolved so much over the last several years, and you will hear all about our new innovative programs in the oral and poster presentations. We have expanded the Poster Session this year to include an Art Exhibition which will celebrate the launch of our *Art of Science* initiative.

I am excited to report that the next three days will include 43 Oral Presentations, 58 Poster Presentations, and 20 pieces of Artwork from a total of 138 Scientists and Artists! The goal of our Symposium is to provide a venue to present scientific research and artwork by our RSC members. The Symposium is the one time each year that the scientists and students in this region come together, inform others of their research, and also listen to their colleagues' research; thereby creating a great opportunity for collaboration among scientists from all disciplines, which I believe to be the spirit of the Consortium. This year we are expanding that spirit to demonstrate how science inspires and is used to create artwork. Our network is growing with the development of a more multi-disciplinary approach. The overlap of science with art has always been apparent in history, and we are looking forward to making that overlap an essential part of the work at the RSC. All of this makes for a great variety of presentations that will interest everyone. Therefore, take the time to listen or view as many presentations and pieces of artwork as you can… they are so impressive this year.

We encourage everyone to attend our Poster Session & Art Exhibition on Wednesday evening from 6:00 – 8:00, providing the opportunity to discuss the projects with the poster presenters and the fusion of science in the artwork with the Artists. All are welcome to attend (*refreshments provided*).

I would like to thank all the participants of the Symposium this year. I would like to thank the Researchers, Professors, Students, and Artists for their hard work in preparing their PowerPoint, poster presentations, and pieces of artwork to display. I would also like to thank Holly Best and the PA DCNR staff of the TREC for the preparations. I would especially like to thank the RSC Team, Jennifer Salem, Sean Dalton, Sarah Magyan, Hailey Dahl, and Jacob Korte for their support of this event and all their work at the RSC. ***Thank you****!*

I hope you all enjoy Symposium 2024! Please mark your calendar for next year's Regional Science Consortium Research Symposium on November 5 – 7, 2025.

Cheers!
Jeanette
Jeanette Schnars, Ph.D.
Executive Director, Regional Science Consortium

SCHEDULE OF TALKS

Regional Science Consortium
20th Annual Research Symposium
November 6-8, 2024
Tom Ridge Environmental Center
at Presque Isle State Park

WEDNESDAY, NOVEMBER 6, 2024

8:30 – 9:30	**REGISTRATION OPENS** Register, upload presentations
8:30 – 9:30	**REFRESHMENTS**
9:30 – 9:40	**WELCOME** Jeanette Schnars, Ph.D., Executive Director, RSC

Presentations

Session Chair: *Jeanette Schnars, RSC Executive Director*

9:40 – 10:00	**The Role of SCAMP3 in APP Trafficking and β-amyloid Production** Ryan Fisher*+ *Biology Department, Gannon University, Erie, PA*
10:00 – 10:20	**Pharmaceutical Intervention of the Obesity Crisis: From Origins to Innovation** Andrew D. Burton*+, Matthew C. Nichilo*+, He Liu, Prasad S. Dalvi *Biology Department, Gannon University, Erie, PA*
10:20 – 10:40	**Sigma factor B as a Potential Regulator of High Salinity Induced Conditional Bacterial Filamentation** Isabella A. Foriska*+, Rajinikanth Mohan *Dept. of Biology, Mercyhurst University, Erie, PA 16546*
10:40 – 11:00	**Comparison of UV light on Colony Growth on Cell Phones Between *Staphylococcus aureus* and *Escherichia coli*** Ryan Zimmerman*+, Nancy Carter, Ph.D., Christopher C. Keller, Ph.D., FNAOME, Robert Waters, Ph.D. *Lake Erie College of Osteopathic Medicine*
11:00 – 12:00	**LUNCH**

Session Chair: *Jen Salem, RSC Plant Lab Manager*

12:00 – 12:20 **The Art of Science: A Multi-disciplinary Approach for all Students**
Ashley Pastore[1]* and Jeanette Schnars, Ph.D.[2]*
[1]Grounded Printshop
[2]Regional Science Consortium

12:20 – 12:40 **Experiential Place-based Learning on Lake Erie: Regional Science Consortium Ship and Shore Program 2024-2025**
Jacob Korte*
Regional Science Consortium

12:40 – 1:00 **Four Seasons of STEAM – Education within the Regional Science Consortium**
Hailey Dahl*
Regional Science Consortium

1:00 – 1:15 **BREAK**

Session Chair: *Hailey Dahl, RSC Education and Outreach Manager*

1:15 – 1:35 **Evaluation of Seed Oils of Economic Importance**
J Esther Anuoluwapo Ominowa[1]; Adebisi Olonisakin[1]; Oluwabunmi Peace Femi-Oloye[2]; Charles Ayodeji Osunla[3]: Femi Francis Oloye[4]*
[1]Department of Chemical Sciences, Faculty of Science, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria, PMB001.
[2]Division of Biological and Health Sciences, University of Pittsburgh at Bradford, Bradford, PA, USA, 16701.
[3]Department of Microbiology, Faculty of Science, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria, PMB 001.
[4]Department of Chemistry, Division of Physical and Computational Sciences, University of Pittsburgh at Bradford, Bradford, PA, USA, 16701.

1:35 – 1:55 **When Serpents Shine: Exploring the Biofluorescent World of Snakes?**
Holden Cooper*+, Lynne Beaty
School of Science, Penn State Behrend, Erie, PA 16503

1:55 – 2:15 **Characterizing the Gut Microbiome of the River Otter (*Lontra canadensis*)**
Libby Babcock*[1]+, Lorenzo Tovanche[1], Jenn Houtz[2], Kelly Pearce[3, 4]
[1] Allegheny College, Undergraduate Student
[2] Allegheny College, Assistant Professor, Department of Biology
[3] Allegheny College, Assistant Professor, Department of Environmental Science and Sustainability
[4] Watershed Conservation Research Center, Allegheny College

2:15 – 2:35 **Characterization of Bacteria from Wild Mushrooms in Allegheny National Forest**
Brice Hansen*+, Hannah Bojczuk, Rajinikanth Mohan
Dept. of Biology, Mercyhurst University, Erie, PA 16546

2:35 – 2:50 **BREAK**

Session Chair: *Sarah Magyan, RSC Aquatic Biologist*

2:50 – 3:10 **Decomposition Markers in Standard Soil Analysis**
*Hannah Skropits, Luis Cabo
Department of Applied Forensic Sciences, Mercyhurst University

3:10 – 3:30 **The Use of Anatomical Variation, Antemortem Skeletal Trauma and Pathology in Human Identification**
Rhiannon Toy*+, Aurora Vana*+, Joe Adserias-Garriga
Department of Applied Forensic Sciences, Mercyhurst University

3:30 – 3:50 **The Importance of Comprehensive Dental Records in Identification Efforts**
*Joe Adserias-Garriga[1, 2], *Hannah Skropits[1, 2], Rupina Bayrakdarian[2]
1: Department of Applied Forensic Sciences, Mercyhurst University
2: International Research Institute of North Carolina

3:50 – 4:10 **Quantifying Skeletal Variation in the Human Skeletal Collection of the Applied Forensic Sciences at Mercyhurst University**
Mikayla Brinkley*, Rhiannon Toy, Aurora Vana, Joe Adserias-Garriga
Department of Applied Forensic Sciences, Mercyhurst University

4:30 – 6:00 **RSC BOARD MEETING** – RSC Board Members – *Room 112*

6:00 – 8:00 **POSTER SESSION & ART EXHIBITION** – All are welcome to attend (*Refreshments provided)*

THURSDAY, NOVEMBER 7, 2024

8:30 – 9:30 **REGISTRATION OPENS**
Register, upload presentations

8:30 – 9:30 **REFRESHMENTS**

9:30 – 9:35 **WELCOME**
Jen Salem, Plant Lab Manager, RSC

Presentations

Session Chair: *Jen Salem, RSC Plant Lab Manager*

9:35 – 9:55 **Underwater Archeological Field Program, Lake Erie, PA, USA**
Carissa Stone*
SUNY Buffalo State University

9:55 – 10:15 **Lake Science for Idiots**
Michael Berlin*
Executive Producer of the Regional Emmy award winning 'Chronicles', WQLN/PBS/NPR

10:15 – 10:35 **Mosaicking the PASST: Photogrammetry with the Pennsylvania Archaeology Shipwreck Survey Team**
Sean Dalton*
Regional Science Consortium

10:35 – 10:50 **BREAK**

Session Chair: *Holly Best, RSC Executive Board Member*

10:50 – 11:10 **Eight Years of Piping Plovers Nesting on Gull Point, Presque Isle State Park, Pennsylvania**
Sarah Sargent, Ph.D.[1]*, Mary Birdsong[1], Catherine Haffner[2]
[1]Erie Bird Observatory, 301 Peninsula Dr, Ste 14, Erie, PA 16505
[2]Pennsylvania Game Commission, Harrisburg, PA

11:10 – 11:20 **Presque Isle Species Lists: A Work in Progress**
Mark Lethaby*
The Natural History Museum at the Tom Ridge Environmental Center 301 Peninsula Dr. Erie, PA. 16505
Speed Talk

11:20 – 11:40 **Utilizing Environmental DNA to Assess Aquatic Diversity at Presque Isle**
Lauren C. Abbott*+, Dr. Louise Nicholson, Dr. David Argent, Dr. Robert Whyte
PennWest University California, Department of Biology, Earth, and Environmental Science

11:40 – 12:00 **Trail of Trouble: Population and Movement Patterns of Invasive Snails**
Lynne Beaty[1]*, Adam Simpson[1], and Sam Nutile[1]
[1]School of Sciences, Penn State Erie - The Behrend College

12:00 – 1:00 **LUNCH**

Session Chair: *Sean Dalton, RSC Lab and Field Manager*

1:00 – 1:20 **Living Bank Stabilization (Soil Bioengineering) on the Wild and Scenic Clarion River**
Bobnar, Luke P.*
Western Pennsylvania Conservancy

1:20 – 1:40 **Instream Habitat Improvement and Monitoring Updates in the Woodcock Creek Watershed**
Kelly Pearce[1, 2]*, Casey Bradshaw-Wilson[1, 2], Mark Kirk[1, 2]
[1]Allegheny College, Department of Environmental Science and Sustainability
[2]Watershed Conservation Research Center, Allegheny College

1:40 – 2:00 **AquaGator: Autonomous Underwater Robot for Water Quality Measurement of Northwest Pennsylvania Lakes**
Pallas-Athena Cain[1]*+, Josephine Reiter[1], Benedek Kaibas[1], Janyl Jumadinova[2],
Allegheny College

2:00 – 2:20 **Monitoring Multiple Cyanotoxins Along the Pennsylvania Coastline of Lake Erie**
Sarah Magyan*
Regional Science Consortium

2:20 – 2:35 **BREAK**

Session Chair: *Jacob Korte, RSC Environmental Education Specialist*

2:35 – 2:55 **Litter in Waterways and Marine Debris Infrastructure**
Don Benczkowski*
Program Coordinator – Lake Erie Region, Keep PA Beautiful

2:55 – 3:25 **Erie Water Works Source Water Assessment and Protection Program**
Katie Stofferahn*, Hannah Burawa*
Erie Water Works

3:25 – 3:45 **The Three Prongs of Project NePTWNE**
Sherrie A. Mason, Ph.D.*
Director, Project NePTWNE
Gannon University, Erie, PA

3:45 – 4:05 **Making the Most of Every Drop: Supporting a Greenhouse Utilizing Stormwater**

Jeanette Schnars, Ph.D.* and Jen Salem*
Regional Science Consortium

FRIDAY, NOVEMBER 8, 2024

8:30 – 9:00 **REGISTRATION OPENS**
Register, upload presentations

8:30 – 9:00 **REFRESHMENTS**

9:00 – 9:10 **WELCOME**
Jeanette Schnars, Ph.D., Executive Director, RSC

Presentations

Session Chair: *Jeanette Schnars, RSC Executive Director*

9:10 – 9:30 **Effects of Water Chemistry on Bosmina Reproduction**
Tara Duffy*+
Biology Department, Gannon University

9:30 – 9:50 **Evaluating the Effects of Safeners and Co-Herbicides on Aquatic Organisms: Toxicity Assessment and Recovery Insights**
Oluwabunmi Femi-Oloye*
Division of Biological and Health Sciences, University of Pittsburgh at Bradford, Bradford, PA 16701
Speed Talk

9:50 – 10:10 **AMPed Up! The Impact of Anti-Microbial Peptides and the Skin Microbiome on American Bullfrog (*Lithobates catesbeianus*) Thermoregulation**
Elise Rinke*+, Lucia Anaya, Dr. Michael Ohmer
Department of Biological Sciences, University of Pittsburgh

10:10 – 10:30 **A Census of the Bat Population on the Campus of Gannon University in Erie, PA**
Kira Armstrong*+, Katrina Orange*+, Dr. Stephen Ropski
Biology Department, Gannon University Erie, PA 16541

10:30 – 10:50 **Behavioral Observation of Grant's Zebras, Spot-nosed Guenons, and Allen's Swamp Monkeys During the Non-circadian Light Levels of the April 8th, 2024 Solar Eclipse at the Erie Zoo**
Chase Bell*+, Katrina Orange*+, Dr. Steve Ropski
Biology Department – Gannon University

10:50 – 11:10 **Measuring Nationwide Atmospheric Changes During the April 8th, 2024 Total Solar Eclipse Using a Series of Compact Weather Sensors**
David Horne*
Gannon University

11:10 – 12:00 **LUNCH**

Session Chair: *Sarah Magyan, RSC Aquatic Biologist*

12:00 – 12:20 **Status of the Lake Erie Fishery**

Mark Haffley*

PA Fish and Boat Commission

12:20 – 12:40 **Evaluating the Population and Movement of Round Goby (*Neogobius melanostomus*) in Elk Creek, a Lake Erie Tributary**

Keri Saulino[1]*+, Sam Nutile[1], Lynne Beaty[1]

[1]Biology Department, School of Science, Pennsylvania State University - The Behrend College Erie, PA 16563

12:40 – 1:00 **Use of eDNA as a Detection Tool for Prioritizing Invasive Round Goby Surveys in the French Creek Watershed**

Casey Bradshaw-Wilson, Ph.D.[1, 2]*, Doug Fischer[3], Vicki Muller[4]

[1]Allegheny College, Department of Environmental Science and Sustainability

[2]Watershed Conservation Research Center

[3]Pennsylvania Fish and Boat Commission

[4]Erie National Wildlife Refuge

1:00 – 1:20 **Predation by Invasive Round Goby (*Neogobius melanostomus*) on Native and Introduced Bivalves in Tributaries of the Lower Great Lakes Basin in Western New York**

Angela Laier[1]*, Matthew Scott[2], Corey Krabbenhoft[2], and Isabel Porto-Hannes[1]

[1]Department of Environment and Sustainability, University at Buffalo;

[2]Department of Biological Sciences, University at Buffalo

Speed Talk

1:20 – 1:35 **BREAK**

Session Chair: *Hailey Dahl, RSC Education and Outreach Manager*

1:35 – 1:55 **Assessing Recovery of the Presque Isle Wetlands from the Invasion of Giant Reed Grass (*Phragmites australis*)**

Joshua Ernst[1], Emma Burkett*[1]+, Robert Whyte[2]

[1]PennWest University Edinboro, Department of Biology, Earth, and Environmental Science

[2]PennWest University California, Department of Biology, Earth, and Environmental Science

1:55 – 2:15 **Characterizing One of Western New York's Most Diverse Mussel Assemblages**

Max S. Striedl[1]*, Jonah A. Fronk[1], Corey A. Krabbenhoft[1], Isabel Porto-Hannes[2]

University at Buffalo

[1]Department of Biological Sciences

[2]Department of Environmental Sciences

2:15 – 2:35	**Are we mussel ready? Evaluating Habitat Water Quality in the Upper Niagara River for Native Mussels (Unionidae)** Jonah A. Fronk[1]*, Max S. Striedl[1], Corey A. Krabbenhoft[1], Isabel Porto-Hannes[2] *University at Buffalo* *[1]Department of Biological Sciences* *[2]Department of Environmental Sciences*
2:35 – 3:00	**BREAK**
3:00 – 3:15	**PRESENTATION OF THE JERRY COVERT STUDENT RESEARCH AWARDS** Jeanette Schnars, Ph.D., Executive Director, RSC Jerry Covert, Ph.D., Past Executive Director, RSC *Student Award Presentations* *Closing Remarks*
3:15 – 4:00	**RESEARCH WING TOURS**

ABSTRACTS

Regional Science Consortium
20th Annual Research Symposium
November 6-8, 2024
Tom Ridge Environmental Center
at Presque Isle State Park

ORAL PRESENTATIONS

Wednesday, November 6, 2024

The Role of SCAMP3 in APP Trafficking and β-amyloid Production

Ryan Fisher*+
Biology Department, Gannon University, Erie, PA

According to the *Journal of the Alzheimer's Association (2024)*, approximately seven million individuals in America are living with Alzheimer's Disease (AD), a number projected to rise to 13.8 million by 2060 [1]. AD is a neurodegenerative disease that causes nerve damage and ultimately leads to cognitive decline as the disease progresses. The pathogenesis of AD is linked to the abnormal accumulation of β-amyloid plaques in the extracellular matrix of the brain. β-amyloid is generated from the amyloid precursor protein (APP), and its production is intimately associated with its trafficking within the TGN-endolysosomal system. [2]. Our findings indicate that the Secretory Carrier Membrane Protein (SCAMP) 3 colocalizes with APP in the *trans*-Golgi Network (TGN). Additionally, SCAMP3 has been shown to interact with the endosomal sorting complexes required for transport (ESCRT) proteins Hrs and Tsg101, both of which have been implicated in APP trafficking and β-amyloid production [5]. In this study, we will investigate the effects of SCAMP3 knockdown on both β-amyloid production and APP trafficking within the TGN-endolysosomal system.

Pharmaceutical Intervention of the Obesity Crisis: From Origins to Innovation

Andrew D. Burton*+, Matthew C. Nichilo*+, He Liu, Prasad S. Dalvi
Biology Department, Gannon University, Erie, PA

Obesity has emerged as a significant global health crisis driven by a complex combination of lifestyle, environmental, and socioeconomic factors that have contributed to its rising prevalence. This review explores contributing factors in obesity pathogenesis such as socioeconomic disparities, sedentary lifestyles, family dynamics, and declining food quality. Despite numerous available treatments, obesity rates continue to climb, emphasizing the need for more effective, safe, and sustainable anti-obesity drugs. This study investigates the evolution of anti-obesity drugs from their historical origins to present-day treatments, analyzing the efficacy, mechanisms of action, and both positive and adverse effects across different populations. The review further examines the future of obesity pharmacotherapy, focusing on recently developed GLP-1 agonists and their potential to transform treatment approaches. This research review aims to offer both historical and forward-looking perspectives to provide a holistic understanding of anti-obesity drug development and its potential impact on public health, ultimately influencing future research, clinical practice, and policy.

Sigma factor B as a Potential Regulator of High Salinity Induced Conditional Bacteria Filamentation

Isabella A. Foriska*+, Rajinikanth Mohan
Dept. of Biology, Mercyhurst University, Erie, PA 16546

Filamentation is a type of anomalous cell growth in which bacterial cells grow unusually long in response to environmental stresses such as high temperature and salinity. The cells respond to the stress by continuing to grow laterally through the preliminary stages of binary fission without dividing through septal wall formation; the resulting cells are called filaments. Filamentation is unique to certain bacterial species and has been shown to benefit bacteria by increasing survival rates and play an integral role in the pathogenicity of certain bacteria. With all that is known about the effects of bacterial filamentation, much is still unknown about the mechanism(s) bacteria use to initiate filamentation. In this study, we aim to study possible mechanisms of bacterial filamentation through studying the genetic screen of knockout mutants in key genes in the model species *Bacillus subtilis.* Preliminary data from simple stain microscopy screenings have revealed the transcription factor gene, *sigB* as a promising candidate for controlling stress-induced filamentation. Under high salinity conditions (10% sodium chloride), unlike the wild type *Bacillus*, (strain 1A1), the *sigB* mutant bacteria were defective in filament formation, suggesting that *sigB* may be an important transcriptional regulator of filamentation. Future experiments include testing the expression of *sigB* under filamenting conditions through quantitative PCR to quantify *sigB* expression levels in response to high salinity and to perform overexpression of *sigB* and genetic complementation tests of the *sigB* knockout mutant to confirm the importance of *sigB* to filamentation in bacteria.

Comparison of UV light on Colony Growth on Cell Phones Between *Staphylococcus aureus* and *Escherichia coli*

Ryan Zimmerman*+, Nancy Carter, Ph.D., Christopher C. Keller, Ph.D., FNAOME, Robert Waters, Ph.D.
Lake Erie College of Osteopathic Medicine

Cell phones are a vital part of allowing healthcare workers to communicate with each other, but can carry large amounts of bacteria, such as *Staphylococcus aureus* and *Escherichia coli*. *S. aureus* is a Gram-positive cocci bacterium that causes upper respiratory and skin infections. MRSA is difficult to treat due to growing antibiotic resistance. *E. coli* is a Gram-negative, rod-shaped bacterium commonly causing urinary tract infections. As antibiotic resistance rise in hospitals, simple methods must be used to control the spread. Hospitals have used UV lights to disinfect operating rooms, but very few require healthcare workers to disinfect their phones with UV before they see patients. This study aims to assess how UV light affects the growth of *S. aureus* and *E. coli*. *S. aureus* and *E. coli* were grown overnight in a broth solution. A phone case with bacteria spread on it, was then placed in a UV light box. The bacteria are then spread onto separate plates. The plates were then placed in an incubator overnight and each colony was then counted. The colony counts for each bacterium were compared using the Shapiro-Wilk test and then a Mann-Whitney U test to determine statistical significance of the experiment. For both bacteria, the UV light box significantly decreased bacterial growth. *S. aureus* growth reduced by 80%, while *E. coli* growth reduced by 71%. Overall, the UV light removed more *S. aureus* colonies from the phone case compared to *E. coli* colonies. The results presented here demonstrate that UV light effectively reduced *S. aureus* and *E. coli* growth on phone cases. This study shows the potential of UV light to reduce colony growth of other bacterial species on phone cases. Thus, applying UV boxes in the healthcare field could be an effective way at reducing the spread of bacteria. Future studies should investigate the UV light effects on growth of other bacterial species commonly seen in hospitals.

The Art of Science: A Multi-disciplinary Approach for all Students

Ashley Pastore[1]* and Jeanette Schnars, Ph.D.[2]*
[1]*Grounded Printshop*
[2]*Regional Science Consortium*

Welcome to where Science meets Art! The fusion of science and art has been around since before the time of Leonardo DaVinci. Since this time, the integration of science and art has been apparent in the work of Naturalists' sketches of flora and fauna in their scientific publications, Artists capturing natural sceneries in paintings and photography, and the use of natural products with the understanding of their biological and chemical properties for use in numerous artistic media. As Albert Einstein once said "*the greatest scientist are artists as well*". The Regional Science Consortium (RSC) is embracing this concept through the partnership with Grounded Printshop in the study of the *Art of Science*. The first phase of this study focused on the harvest of invasive plants to create handmade artist paper with authentic texture and design. The process of making the paper includes chipping, cooking, and beating the invasive plant biomass into a form that can be used to pull sheets of paper with mold and deckles. Inclusions of pressed flowers and other plant products are incorporated into the sheets prior to drying. The product is an artistic material with versatile uses that diverts this mass from going into the landfill. The second phase of this study will focus on pigment extraction from berries, leaves, bark, and other plant materials.

Experiential Place-based Learning on Lake Erie: Regional Science Consortium Ship and Shore Program 2024-2025

Jacob Korte*
Regional Science Consortium

The Regional Science Consortium started this academic year with the Ship & Shore Program 2024-2025. This experiential, place-based, learning program continues throughout the duration of the school year. Students from member school districts had the opportunity to collect environmental data, process and analyze samples, and will brainstorm ideas to create awareness about and protect Lake Erie as a resource. For Part I, students joined the RSC staff in downtown Erie where they (1) set sail on the Lettie G. Howard historical tall ship where they learned about sailing and environmental issues concerning Lake Erie,(2) collected water and biological samples to assess the water quality of the lake, and (3) participated in the basics of knot tying and experimented with boat building with the help of the Flagship Niagara League and Bayfront Maritime Center. For Part II, these students will visit the research labs at the Regional Science Consortium to process and analyze their water samples for bacterial concentrations, sediment samples for macroinvertebrates, and tow samples for plankton. Throughout the remainder of the school year students will develop and implement a Stewardship Action Project at their school following a MWEE (meaningful watershed educational experience) approach and aligning to PA STEELS Standards. Guidance will be provided by RSC staff as the students formulate their own project raising awareness for the improvement of water quality. Teacher training will be provided by RSC staff for the project as well.

Four Seasons of STEAM – Education within the Regional Science Consortium

Hailey Dahl*
Regional Science Consortium

"The Four Seasons of STEAM" takes place for another year, presented to Regional Science Consortium member school districts. This four-part, hands-on, experiential journey takes students through the ever-changing topics of STEAM in correlation to the changing seasons. The RSC provides examples of how STEAM topics are related in a region that experiences 4 different seasons throughout the year. Students will join the RSC in the Fall for the Artistic Expression in Scientific Preservation, in the Winter for Shipwrecks and SCUBA, in the Spring for Technology in Agriculture, and in the Summer for an overnight field experience at Presque Isle State Park. Education in the Regional Science Consortium continues to expand greatly through summer camps and more.

Evaluation of Seed Oils of Economic Importance

J Esther Anuoluwapo Ominowa[1]; Adebisi Olonisakin[1]; Oluwabunmi Peace Femi-Oloye[2]; Charles Ayodeji Osunla[3]: Femi Francis Oloye[4]*

[1]*Department of Chemical Sciences, Faculty of Science, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria, PMB001.*

[2]*Division of Biological and Health Sciences, University of Pittsburgh at Bradford, Bradford, PA, USA, 16701.*

[3]*Department of Microbiology, Faculty of Science, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria, PMB 001.*

[4]*Department of Chemistry, Division of Physical and Computational Sciences, University of Pittsburgh at Bradford, Bradford, PA, USA, 16701.*

Pennsylvania has an abundance of plants and therefore, has potential raw materials for many applications. Our group at the University of Pittsburgh Bradford is interested in working with plant scientists to identify plants whose constituents have not been characterized, or that are not well characterized so that we can use our expertise to unravel the chemical components of such plants. In this symposium, the oil contents and fatty acid composition of three non-edible seed oils extracted using Soxhlet extraction with hexane as the solvent will be presented. The physical and chemical properties of the oils were determined from which cetane number, biofuel potential, higher heating values, and antimicrobial activities were assessed. The dominant fatty acids were 49% linoleic acid, 37% pentadecenoic acid, and 38% cis-10-heptadecenenoic acid for *Hura crepitans* (HC), *Thevetia nerifolia* (TN) and *Trichosanthes cucumerina* (TC), respectively. The seed oils were majorly unsaturated, with HC having the highest degree of unsaturation. Acid value, saponification value, iodine value, and free fatty acids were low compared to many reported values in literature. The cetane values were generally high because the oils have a reasonable amount of saturated fatty acid, with TN having the highest cetane number. The low iodine value and saponification value make the biofuel potential and higher heating value to be high with TN having the highest in both and thus the best seed oil for biofuel. However, TN and HC have no antimicrobial activity to *Klebsiella pneumoniae* (gram -ve), *Staphylococcus aureus* (gram +ve), *Escherichia coli* (gram -ve), *Bacillus subtilis*, Enterobacter aerogenes, *Candida albican*, *Rhizopus stolonifer*, *Fusarium Solani*, *Aspergillus flavus* and *Candida tropicalis*, while TC has broad spectrum of activity against all tested bacteria and fungi, except Klebsiella pneumoniae.

When Serpents Shine: Exploring the Biofluorescent World of Snakes?

Holden Cooper*+, Lynne Beaty

School of Science, Penn State Behrend, Erie, PA 16503

Biofluorescence has been increasingly documented in terrestrial vertebrates, though gaps in our understanding of this trait in many species, especially snakes, remain. Previous studies have shown that snakes will biofluoresce blue in response to UV light, but how many snake species biofluoresce in response to other excitation wavelengths is unknown. In our study, we used a combination of preserved shed skins and live snakes to document biofluorescent patterns in response to UV, blue, and green light, then compared these patterns across different snake species. To do this, wild live snakes were sampled in the field, while shed skins lent to us by the Natural History Museum at the Tom Ridge Environmental Center were processed in the lab. Live snakes and shed skins were photographed under diffuse white light to document their normal appearance, followed by UV, blue, and green light exposure with corresponding longpass filters to document biofluoresced wavelengths. Shed skins were additionally subjected to violet and cyan excitation lights. Ventral surfaces of live snakes and their sheds displayed more intense biofluorescence than any dorsal regions for all wavelengths. Ventral surfaces may display more pronounced fluorescence for intraspecific communication, as the wavelengths snakes biofluoresce most prominently to are abundant when snakes are most active. Biofluorescence research in terrestrial organisms is limited, making our study a novel contribution documenting the presence of the trait in an overlooked taxon.

Characterizing the Gut Microbiome of the River Otter (*Lontra canadensis*)

Libby Babcock*[1]+, Lorenzo Tovanche[1], Jenn Houtz[2], Kelly Pearce[3, 4]

[1] *Allegheny College, Undergraduate Student*

[2] *Allegheny College, Assistant Professor, Department of Biology*

[3] *Allegheny College, Assistant Professor, Department of Environmental Science and Sustainability*

[4] *Watershed Conservation Research Center, Allegheny College*

River otter (*Lontra canadensis)* populations in Pennsylvania have made a huge comeback since reintroduction efforts started in 1983. They have recolonized their original range and are now present in most areas that they were historically extirpated. With the last river otter being reintroduced in 2004, the river otter population is considered established and stable. River otters are a top carnivore in the ecosystem and so understanding the health of their population can be indicative of the health of the entire ecosystem. During the summer of 2024, a research study was started with the goal of characterizing the gut microbiome of river otters in the French Creek watershed. Sequencing the gut microbiome will allow for better knowledge of what conservation techniques to implement and the overall health of the river otter population in northwestern Pennsylvania. Five river otter latrines were located between the Erie National Wildlife Refuge, State Game Lands 270, 213, 214, and along Caldwell Creek. Nine fresh scat samples were collected and stored between July and October. We will extract DNA and then conduct 16S rRNA sequencing of the bacteria extracted from otter fecal samples. Understanding the overall diversity and community membership of the gut microbiome will provide us with a picture of what a healthy microbiome looks like for the river otter population in northwestern Pennsylvania.

Characterization of Bacteria from Wild Mushrooms in Allegheny National Forest

Brice Hansen*+, Hannah Bojczuk, Rajinikanth Mohan

Dept. of Biology, Mercyhurst University, Erie, PA 16546

Wild mushrooms play important ecological roles in decomposition and nutrient cycling in nature. In addition, there is growing interest in mushroom cultivation, because they are considered a sustainable food crop. Pathogenic bacteria are known to spoil cultivated mushrooms, but little is known about if and why bacteria associate with wild mushrooms. In this study, in order to understand what bacteria exist inside of ten diverse wild mushrooms and what functions they might be performing, we used serial dilution plating and 16S ribosomal RNA sequencing and identified 35 bacterial isolates including a few UV-fluorescent bacteria. Considering the diversity of mushrooms studied, we were surprised to find the same bacterium, *Ewingella americana,* which is a known cause of cultivated mushroom spoilage, in seven of the ten wild mushrooms. Intriguingly, most of the isolated bacteria were cold tolerant to near freezing temperature, which is surprising because wild mushrooms only grow in a specific temperature range. Most of the mushroom bacteria were also citrase positive, suggesting that wild mushrooms may contain citric acid. Many of the mushrooms also displayed an ability to solubilize phosphate, which is most likely due to the abundance of phosphorous present in mushrooms. A better understanding of different bacteria inside of wild mushrooms could be useful for the rising population of mushroom foragers and the growing presence of mushrooms in our diets as well as in the biological understanding of the importance of interaction between mushrooms and bacteria.

Decomposition Markers in Standard Soil Analysis

*Hannah Skropits, Luis Cabo

Department of Applied Forensic Sciences, Mercyhurst University

Establishing the postmortem interval (PMI) for human remains can be challenging. Beyond the initial 48 to 72 hours, the physiological markers utilized in forensic pathology stop being useful, and the estimates for longer PMIs, in the weeks to years ranges, must rely on insect activity, the stage of tissue decomposition, or degree of taphonomic alteration. Current organic tissue decomposition and alteration methods are based primarily on visual assessments, and their underlying processes are highly dependent on temperature and ecological factors. This results in highly imprecise estimates, with

broad confidence intervals, and high inconsistencies across geographical regions. Soil chemistry offers an increasingly promising alternative to quantify decomposition more precisely, through its chemical byproducts, and more approachable models to integrate PMI, decomposition, soil properties, and temperature. Several chemical markers have been proposed for this purpose, from pH to an array of organic byproducts. This approach is still in its infancy, and most proposed methods require costly instrumentation and advanced training not only for the analytical component, but also for sample collection. This study explores the potential utility of simple and affordable standard chemical analyses, widely available in all jurisdictions through soil analysis services for agricultural purposes. It focuses primarily on the evolution of proteolysis byproducts concentrations, exploring a wide array of chemical targets from standard compost analysis. We identified soil pH and ammonia concentration as the most promising byproducts to link PMI and decomposition, in a model that allows for easy integration of initial soil characteristics and factors such as temperature.

The Use of Anatomical Variation, Antemortem Skeletal Trauma and Pathology in Human Identification

Rhiannon Toy*+, Aurora Vana*+, Joe Adserias-Garriga
Department of Applied Forensic Sciences, Mercyhurst University

When it comes to the identification and classification of different types of traumas to the human skeleton, there are three timeframes that can be used. Antemortem which is before death, perimortem which is around or at the time of death, and postmortem which is after death. Although antemortem trauma does not relate to the cause of death or the events that occurred before death, antemortem trauma can play an important role in the identification of the remains. Antemortem fractures can be used to confirm the identity of a deceased individual through the comparison of antemortem and postmortem data. As no fracture callus have the same morphology, it can be used to confirm the identity of an individual. Classically, pathological signs in the skeleton have been related as possible means of identification; as well as anatomical variations. This oral presentation explores the frequency of pathological conditions, anatomical variation and antemortem fractures in the donated collection of the Department of Applied Forensic Sciences at Mercyhurst University. Additionally, their usefulness for identification will be presented through the description of positive identifications within the cases that the Department of Applied Forensic Sciences at Mercyhurst University has carried out in the last 5 years.

The Importance of Comprehensive Dental Records in Identification Efforts

*Joe Adserias-Garriga[1, 2], *Hannah Skropits[1, 2], Rupina Bayrakdarian[2]
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2: International Research Institute of North Carolina

Forensic odontology is a critical tool for identifying deceased individuals along with other methods, such as DNA analysis or fingerprinting. This study analyzed 76 cases of unidentified or missing persons from the Mercyhurst Forensic Anthropology Laboratory, focusing on the frequency and modality of dental records, treatment, and anatomical variation used in the identification process. Of these cases, 86.8% utilized dental records as the key factor in identification, with additional reliance on DNA analysis in 9.2% and surgical devices in 2.6%. The data reveals that dental records, especially dental radiographs, are highly valuable to assist in identification across all age groups. Although dental treatment is the most used trait in the comparison between antemortem and postmortem records, anatomical variation can be key in the process of identification, when no dental treatment is presented. These findings highlight the importance of comprehensive dental records in forensic investigations and the significance that dental evidence in achieving the identity of a set of remains.

Quantifying Skeletal Variation in the Human Skeletal Collection of the Applied Forensic Sciences at Mercyhurst University

Mikayla Brinkley*, Rhiannon Toy, Aurora Vana, Joe Adserias-Garriga
Department of Applied Forensic Sciences, Mercyhurst University

When human remains are found, the first priority of the forensic investigation is to ascertain the identity of the deceased. Establishing a positive identification of human remains is often accomplished through DNA, fingerprints, or odontology. However, when these primary identifiers cannot be applied, practitioners can rely on the comparison between the antemortem and the postmortem data of skeletal traits. Certain skeletal traits have been established as highly individualistic, such as dental morphology, frontal sinus morphology, and structure and fracture callus morphology. However, there is a lack of knowledge on how frequent certain anatomical variants are in a population, which is key for establishing a hierarchy of different anatomical traits according to their frequency: the more frequent the trait is, the less individualistic it is. Therefore, the least frequent anatomical variants are the most valuable ones for identification purposes. Moreover, combining different anatomical features equates to higher robustness during comparative analysis. No quantitative data is available on how frequent a combination of skeletal traits is, and nowadays, this assessment relies entirely on the expertise of the forensic practitioner. This lack of quantitative, and objective, data represents an important need of further research on this topic to emphasize the objectivity of the identification process. This presentation consists of the quantification of certain skull traits in the Department of Applied Forensic Sciences skeletal collection at Mercyhurst University.

Underwater Archeological Field Program, Lake Erie, PA, USA

Carissa Stone*
SUNY Buffalo State University

The Lake Erie Underwater Cultural Resource Management Archaeology Field School contained learning information on underwater cultural resource management (CRM) at Lake Erie, PA, as part of a specialized field school, led by two instructors with doctoral degrees and a teaching assistant (Dr. Ford, Dr. Halligan, and assistant Adam Burke). Ten students, including myself, were part of this hands-on experience with SCUBA-assisted archaeological research, and marine survey with side scan sonar and sub-bottom profiling. The program also trained students in the use of software like SonarWiz for processing and interpreting sonar data. A significant component of the course involved the trilateration technique to take precise measurements of the *Canobie* shipwreck, a vessel that sank in Lake Erie, PA. Students worked in alternating shifts between the lab using SonarWiz to go through hours of data pinpointing anomalies that we assume were manmade or represented buried strata, while the other set of students recording the *Canobie*, practicing trilateration. Students also engaged in various field methods, including remote sensing, geophysical surveying, and underwater recording. Students learned about legal frameworks such as the National Historic Preservation Act (NHPA) and the Native American Graves Protection and Repatriation Act (NAGPRA). The students and instructors also enjoyed a day off attending the Veterans Seneca Powwow of 2024 hosted by two of Indigenous students attending the program, so the other students and instructors got to view a portion of the indigenous lifestyle. This course emphasized consultation, reporting, and public interpretation of submerged cultural resources, contributing to the preservation of underwater heritage and preparing students for future careers in marine archaeology, and cultural resource management.

Lake Science for Idiots

Michael Berlin*
Executive Producer of the Regional Emmy award winning 'Chronicles', WQLN/PBS/NPR

Along the shores of Lake Erie there is a bevy of activity that most of the public is completely unaware of - whether it's the changing ecological conditions of the lake, the history of the economy of the docks, or the research that is done on a daily basis. So, what happens when you have a television show featuring the Lake and none of your team share the accreditation of the individuals you are looking to interview? This was the case for the WQLN/PBS/NPR show 'Chronicles'. The objective of 'Chronicles' is - and always was - to preserve the history of the region and educate a diverse audience while simultaneously putting that history into context. To meet that goal, the production team required a crash course in the science of the lake while working against the very real pressures of a broadcast deadline. By building connections with local and regional organizations and experts, 'Chronicles' successfully provided a platform to share the ecological and economic history of the lake to the community. The fresh perspectives offered here will hopefully lead to increase advocacy and interest into everything happening in lake science.

Mosaicking the PASST: Photogrammetry with the Pennsylvania Archaeology Shipwreck Survey Team

Sean Dalton*
Regional Science Consortium

PAAST, The Pennsylvania Archaeology Shipwreck Survey Team, is a group composed of representatives from the RSC, Diver's World, Flagship Niagara League, Indiana University of PA, PA DCNR, PA DEP – Coastal Management Program, and S.O.N.S. of Lake Erie. This volunteer working group is dedicated to the documentation, preservation, scientific study, and educational promotion of Pennsylvania's underwater archeological resources. With the support of the National Marine Sanctuary Foundation, RSC staff alongside PAAST leadership, will be working towards developing 2-5 new shipwreck photomosaics,

as well as 1-3 photogrammetry models of the shipwrecks themselves. Photogrammetry allows photography to be used for surveying and mapping purposes, and in this application can allow the development of three-dimensional models. In addition to the insight this will provide about the cultural history of our area, the photomosaics and photogrammetry models will be contributions towards the NOAA designation of the Pennsylvania Lake Erie National Marine Sanctuary.

Eight Years of Piping Plovers Nesting on Gull Point, Presque Isle State Park, Pennsylvania

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Piping Plovers historically nested along the outer beaches of Presque Isle until the 1950s when they were extirpated from Pennsylvania. The Great Lakes population of Piping Plovers was listed as endangered under the Endangered Species Act in 1986; at that time there were fewer than 20 nests documented, all in northern Michigan. Recovery efforts since then have included multiple federal, state and nonprofit partners, and the population has grown to 81 nests in 2024 and has expanded to include sites on all the Great Lakes. Piping Plovers resumed nesting at Presque Isle in 2018, and since then have nested every year. So far we have had 17 nests with 66 eggs laid, and 21 chicks have fledged in the wild. Several of these have returned to nest in subsequent years. In addition, eggs from Presque Isle have been sent to the captive rearing program in Michigan and some of those chicks have been released at historic nesting sites in hopes of having them reestablish nesting there. Presque Isle continues to be the only regular nesting site for this species in Lake Erie.

Presque Isle Species Lists: A Work in Progress

Mark Lethaby*
The Natural History Museum at the Tom Ridge Environmental Center 301 Peninsula Dr. Erie, PA. 16505

Speed Talk

Natural history studies on Presque Isle largely begin with a few naturalists that did pioneering studies of the peninsula's flora and fauna at the turn of the twentieth century. The work of Jennings (plants), Todd (birds), Ortmann (mussels), and Atkinson (reptiles and amphibians) laid the foundations of our knowledge of Presque Isle's biota. Subsequent surveys and miscellaneous observations have been sporadic, except for certain well-studied groups such as birds and plants. Knowledge of the biodiversity of an area is key to its responsible management. I have compiled lists of all documented species of plants, fungi, and animals on the park using available resources. I will discuss what is known of the park's biodiversity and the need for additional information.

Utilizing Environmental DNA to Assess Aquatic Diversity at Presque Isle

Lauren C. Abbott*+, Dr. Louise Nicholson, Dr. David Argent, Dr. Robert Whyte
PennWest University California, Department of Biology, Earth, and Environmental Science

This study highlights the effectiveness of using eDNA for baseline biodiversity monitoring. Presque Isle is a hub of biodiversity and a critical site for conservation goals within Pennsylvania. It hosts a variety of terrestrial, wetland, and aquatic ecosystems, each with their own diverse environments. This study aims to measure biodiversity in ponds on Gull Point at Presque Isle State Park using environmental DNA (eDNA). This provides a non-invasive method for monitoring communities and the detection of new species. Water samples were collected from seven ponds and eDNA was used to isolate the species present. Preliminary analysis indicates the presence of both native and non-native organisms. This method allows for a comprehensive assessment of biodiversity and community composition. Both measures can aid in determining the health and resiliency of these ecosystems. These findings offer a baseline point for marking biodiversity and can aid in conservation efforts by allowing for careful monitoring of ecosystem compositions. Results may be used to aid in the ongoing effort to control submergent and emergent

invasive plant species on Presque Isle. Future directives could also compare seasonal variations in species richness as this aquatic system recovers.

Trail of Trouble: Population and Movement Patterns of Invasive Snails

Lynne Beaty[1]*, Adam Simpson[1], and Sam Nutile[1]
[1]*School of Sciences, Penn State Erie - The Behrend College*

Invasive, nonindigenous species can influence native communities directly via consumption and indirectly through trophic cascades and accidental stowaways (e.g., parasites). Because of their diet variety and obligatory role in trematode life cycles, freshwater snails can significantly affect the communities they invade. Presque Isle State Park is currently home to several invasive, nonindigenous freshwater snail species, including mysterysnails (*Cipangopaludina/Margarya* spp.) which have the potential to impact the coastal ecosystems of Lake Erie negatively. In the Summers of 2023 and 2024, we performed robust mark-recapture studies of invasive mysterysnails in Presque Isle State Park, generating population size estimates and documenting snail movements throughout the park. While most individuals were recaptured where they were initially tagged, a few were recaptured at distant locations in the park. This suggests that there may be human-facilitated movement of snails around the park. Future studies will use genetic tools to assess the population structure of snails in the park.

Living Bank Stabilization (Soil Bioengineering) on the Wild and Scenic Clarion River

Bobnar, Luke P.*
Western Pennsylvania Conservancy

Clear Creek State Park (CCSP) in northern Jefferson County, PA, is bordered to the North by the Wild and Scenic Clarion River. During the late 1990's, a section of this riverbank downstream of the mouth of the Clear Creek stream and 1,500 feet long began eroding at a rate of approximately three feet per year. Several factors are thought to have contributed to the erosion, including mowing to the riverbank edge, an undersized stream crossing, and changing upstream watershed characteristics. Due to an intense regulatory framework protecting Wild and Scenic Rivers from any modification nationally, CCSP staff contacted the Western Pennsylvania Conservancy (WPC) for assistance. WPC relied on expertise from national, state, and local personnel to develop and permit a strategy that stabilized the bank, protected some of the most favored campsites in the park, and enhanced terrestrial and aquatic habitats. Construction occurred in July and August of 2024, when soil bioengineering techniques using toe wood and soil-brush lifts with coconut coir fabric, as well as, live, native, woody, riparian shrub cuttings were applied. Small engineered log jams were also installed to deflect erosive flows back towards the channel center. This method, somewhat novel to PA, facilitated project goal completion while staying within the Wild and Scenic River management framework. This presentation will discuss the project from it's genesis to current status, various hurdles, lessons learned, and future plans. The project was financed in part by a Growing Greener Grant provided by the Pennsylvania Department of Environmental Protection.

Instream Habitat Improvement and Monitoring Updates in the Woodcock Creek Watershed

Kelly Pearce[1, 2]*, Casey Bradshaw-Wilson[1, 2], Mark Kirk[1, 2]
[1]*Allegheny College, Department of Environmental Science and Sustainability*
[2]*Watershed Conservation Research Center, Allegheny College*

In partnership with the Crawford County Conservation District and the Pennsylvania Fish and Boat Commission, the Watershed Conservation Research Center (WCRC) has completed 3 in-stream habitat improvement projects in the Woodcock Creek watershed, a sub-watershed of the French Creek watershed since 2021. These projects aim to reduce sediment loading and nutrient build-up downstream of the restoration sites while enhancing fish populations at the project locations. To assess changes, the WCRC has collected data on sedimentation, fish and macroinvertebrate diversity, nutrients and bacteria, and water chemistry variables pre and post restoration to evaluate impacts of the restoration efforts. In 2024, we installed 9 HOBO loggers up and downstream of restoration sites to further assess changes in light and temperature at sites. Preliminary data suggests that the restoration sites have seen an increase in fish

diversity, no change in macroinvertebrate communities, and a pattern of decreasing nitrate, phosphate and e.coli concentrations.

AquaGator: Autonomous Underwater Robot for Water Quality Measurement of Northwest Pennsylvania Lakes

Pallas-Athena Cain[1]*+, Josephine Reiter[1], Benedek Kaibas[1], Janyl Jumadinova[2],
Allegheny College

We present AquaGator, an automated underwater robotic sensor system for water quality monitoring. AquaGator is a portable system consisting of multiple sensors on a mobile robotic platform for autonomous data collection and analysis across varying water depths. The Northwestern Pennsylvania region is significantly impacted by toxic algae blooms, which necessitate effective water quality monitoring. Traditional methods are often labor-intensive, creating a need for an accessible and automated solution. This project addresses this gap through the development of cost-effective underwater robots, AquaGators, capable of autonomously gathering water quality data and facilitating efficient analytics. The robots can navigate autonomously to desired depths, measure water quality parameters over a set period, and provide live data graphs through a user-friendly dashboard. The software developed for this project also facilitates the generation of analytics essential for assessing the health of aquatic environments. A manually controlled mode and underwater camera enhance their functionality, providing visual insight into aquatic environments. The robots engineered through this project are set to be deployed by the local Conservation District for routine water quality monitoring activities and education. The project's successful implementation of depth automation is expected to significantly streamline the conservation districts water quality monitoring processes, providing a sustainable tool for the ongoing health assessment of local aquatic ecosystems.

Monitoring Multiple Cyanotoxins Along the Pennsylvania Coastline of Lake Erie

Sarah Magyan*
Regional Science Consortium

Although Lake Erie is known for its chronic HAB events in the western basin, the Pennsylvania waters of Lake Erie also frequently experience HAB events. The Regional Science Consortium has been monitoring cyanotoxins (Microcystins/Nodularins, Anatoxin-a, Saxitoxin, and Cylindrospermopsin) since 2014. Water samples were collected weekly from 33-42 sites along the PA shoreline of Lake Erie, Presque Isle Bay, inland lakes, and drinking water facilities. Samples were analyzed by algal toxin ELISA plates using Abraxis/Gold Standard Diagnostics kits. Results were typically provided the same day of sampling or within 24 hours to PA Department of Conservation and Natural Resources, Erie County Department of Health, Erie Water Works, and North East Drinking Water Facility. Signage was posted at sampling sites that exceeded safe dog, human advisory, and human restriction thresholds according to the Lake Erie Harmful Algal Bloom Monitoring and Response Strategy. As part of these efforts to improve understanding of the HABs in our area, the RSC will be implementing a new technology called BloomOptix which uses an AI model to identify algal species present in samples.

Litter in Waterways and Marine Debris Infrastructure

Don Benczkowski*
Program Coordinator – Lake Erie Region, Keep PA Beautiful

This pilot project was initiated to determine the effectiveness of a specifically designed litter boom to capture marine debris from an outflow pipe along the Presque Isle Bay in Erie, Pennsylvania. Two litter booms were installed in Wolverine Marina on the campus of Lakeshore Towing Services Inc. (34 State Street, Erie, PA 15607). Litter was collected 1-2 times per week and after storm events from June – December 2023, and June – October 2024. Floating litter was collected by staff and interns from the Regional Science Consortium using long-handled nets. The litter was categorized and quantified by type. Other data collected included the weather and meteorological conditions on each sampling date for each location. The importance of this study was to determine the effectiveness of the litter booms in collecting

and removing the litter from entering the bay. The study sites also revealed unexpected pollution events via runoff. The litter booms proved to be very successful in capturing small pieces of litter, which pose the greatest threat of being mistaken as food and ingested by fish, shorebirds, and other wildlife. The future of this project includes the installation of additional litter booms on the bayfront.

Erie Water Works Source Water Assessment and Protection Program

Katie Stofferahn*, Hannah Burawa*
Erie Water Works

The Pennsylvania Department of Environmental Protection Source Water Assessment and Protection (SWAP) Program is a voluntary, community-based effort to protect the raw water quality of sources used by community public water supply systems. Participating systems receive a complimentary Source Water Protection Plan, which offers scientific guidance for identification and delineation of source water protection areas, highlights potential contamination risks, assists in disaster planning, and provides educational resources for both businesses and residents. This plan can also help reduce costs by minimizing the need for extensive treatment. Erie Water Works ("EWW"), the largest public water system in Northwest Pennsylvania by population served, has opted to join this program. EWW's participation is particularly noteworthy due to its water intakes located in Lake Erie. Community outreach and education will be central to this initiative, with collaborations established alongside local organizations that share common goals. Additionally, we will discuss a recent EWW project—the Greene Township Water Main Extension—which enables the delivery of Lake Erie water to rural Greene Township. This project exemplifies the critical importance of safeguarding drinking water at its source, underscoring the need for proactive measures in ensuring water quality for future generations. Together, these efforts highlight a commitment to sustainable water management and community engagement.

The Three Prongs of Project NePTWNE

Sherrie A. Mason, Ph.D.*
Director, Project NePTWNE
Gannon University, Erie, PA

Gannon University's Project NePTWNE takes an inclusive and holistic approach to addressing climate change through recognition of its connection to water quality, economic development, and quality of life. A major factor impacting water quality and ecological health is the presence of microplastics in waterways. Measuring and removing these pollutants, along with developing new solutions to prevent the pollutants from ever entering the water, must be a priority for our region. Overall, project NePTWNE is a large, multifaceted project, which is still in its infancy. Come hear more about the initiative and what it means for education and research opportunities in our region from the new director of Project NePTWNE, Dr. Sherri Mason.

Making the Most of Every Drop: Supporting a Greenhouse Utilizing Stormwater

Jeanette Schnars, Ph.D.* and Jen Salem*
Regional Science Consortium

Stormwater runoff in an urban environment can transport pollutants, excessive nutrients, and litter to adjacent waterways. The implementation of stormwater management best management practices (BMPs) can reduce the impact of runoff to water quality and the flora and fauna that inhabit this ecosystem. Through support of a PA DEP Growing Greener grant, stormwater BMPs are currently being implemented on the Gannon University campus. These BMPs include removing impervious surfaces, and the installation of rain gardens, rain barrels, and a rain capturing cistern. Many of the BMPs are located at the new campus greenhouse site (Myrtle Street & West 4th Street). This site includes an automated environmentally controlled greenhouse (71' x 21') providing 1,512 sq. ft. of growing space and an educational support building. The greenhouse will grow plants for wetland and dune restoration projects, and native plants for local native gardens. A rain garden, pollinator garden, and native garden have been installed on the site. Rain barrels will be installed on the educational building and a large rain cistern will

be installed on the greenhouse. These BMPs will prevent excessive rainwater from entering the storm drains and the captured water will be used to water the plants in the greenhouse. Educational community programming will include a Rain Barrel Workshop and Rain Garden Workshop in April and May.

Effects of Water Chemistry on Bosmina Reproduction

Tara Duffy*+
Biology Department, Gannon University

Zooplankton serve as important food sources for young fish and are sensitive to changes in water conditions. Reproduction trends of the dominant, small zooplankton, Bosmina, were examined. Zooplankton samples were collected from Presque Isle Bay from May-October in 2023. Samples were collected using a 20-cm vertical net with 153 µm mesh lowered to near the bottom of the bay (5m) and pulled to the surface. I examined females in stages of reproduction and identified eggs in brood pouches as asexual or sexual, then determined the number of eggs per individual. Seasonal changes in Bosmina reproduction rates will be compared to nutrient and light data collected at the same time as zooplankton samples.

Evaluating the Effects of Safeners and Co-Herbicides on Aquatic Organisms: Toxicity Assessment and Recovery Insights

Oluwabunmi Femi-Oloye*
Division of Biological and Health Sciences, University of Pittsburgh at Bradford, Bradford, PA 16701

Speed Talk

The use of agricultural chemicals, including safeners and co-herbicides, is on the increase and this raises concerns about their impact on aquatic ecosystems. This study will evaluate the toxicity of selected safeners and co-herbicides on various aquatic organisms, including fish, invertebrates, or algae. We will employ standardized toxicity tests to assess the short-term and long-term effects of these compounds, focusing on apical endpoint including survival, growth, and reproductive metrics. Additionally, we will investigate the recovery potential of affected organisms following exposure, examining factors such as environmental conditions and life history traits. Results from toxicity studies will help in identifying the potential adverse effects caused by chemicals, which can lead to measurable declines in population health. Recovery assessments will help reveal variability across species, to evaluate resilience or prolonged impacts in exposed organisms. Findings from this study will underscore the need for comprehensive risk assessments of agricultural chemicals in aquatic environments, informing regulatory practices and guiding sustainable agricultural strategies. This study will highlight the importance of understanding both immediate toxicity and recovery dynamics to protect aquatic biodiversity.

AMPed Up! The Impact of Anti-Microbial Peptides and the Skin Microbiome on American Bullfrog (*Lithobates catesbeianus*) Thermoregulation

Elise Rinke*+, Lucia Anaya, Dr. Michael Ohmer
Department of Biological Sciences, University of Pittsburgh

Global amphibian populations have been decimated by chytrid fungus (*Batrachochytrium dendobatidis*), a fungal pathogen that impacts over 700 species. Behavioral thermoregulation has been shown to impact disease outcomes, with frogs that thermoregulate at higher temperatures being more resilient. However, many of the biological mechanisms that affect thermoregulation are poorly understood. Anti-microbial peptides (AMPs) and the skin microbiome are two parts of the innate immune system that have been predicted to impact thermoregulation and therefore disease resilience. AMPs are secreted in mucus produced in sub-epidermal granular glands, while the skin microbiome consists of the independent microorganisms that inhabit the frog's skin. Both serve as a first line of defense against disease. Through this study, we investigate how inhibition of the innate immune system impacts thermoregulation and chytrid fungus load of American Bullfrogs (*Lithobates catesbeianus*) in the field.

A Census of the Bat Population on the Campus of Gannon University in Erie, PA

Kira Armstrong*+, Katrina Orange*+, Dr. Stephen Ropski
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For the past 17 summers, a census of the bat population has occurred on the Gannon University campus in Erie, PA. The numbers for the first three years held relatively steady, but the data for the past 14 years indicates a dramatic decline. White Nose Syndrome was first reported in 2006 in a cave in New York State. The disease has killed an estimated 7 million bats in the eastern United States since then and has spread throughout Pennsylvania the country. This fungal infection has killed 95% of bats in some caves and has resulted in the listing of three bat species as endangered in Pennsylvania, including the Little Brown Bat (*Myotis lucifugus*), the predominant bat on the Gannon campus. This study will compare yearly data by building, time of year, building side, and species composition to determine how White Nose Syndrome has affected the Gannon campus bats. A decrease in numbers may be partially responsible for an increase in West Nile Virus in the area. The results allowed us to place bat houses at appropriate locations to encourage an increase in bat presence on campus.

Behavioral Observation of Grant's Zebras, Spot-nosed Guenons, and Allen's Swamp Monkeys During the Non-circadian Light Levels of the April 8th, 2024 Solar Eclipse at the Erie Zoo

Chase Bell*+, Katrina Orange*+, Dr. Steve Ropski
Biology Department – Gannon University

The April 8th , 2024 Eclipse in Erie, Pennsylvania provided an opportunity to study simulated dusk at a non-circadian time. The eclipse reached full totality between 3:16 p.m. and 3:20 p.m. During this time, light approximated typical post-dusk light levels. Animal behavior in Grant's zebras (*Equus quagga boehmi*), spot-nosed guenons (*Cercopithecus petaurista*), and Allen's swamp monkeys (*Allenopithecus nigroviridis*) were studied using trail cameras. Research was based around monitoring the impacts of dusk-like lighting on normal activity as well as investigating possible predator avoidance response to changing light, temperature, and pressure. Results varied by species and by age. The older of the two zebras responded more strongly by positioning its body in the stall with only its head out. The primates exhibited some affiliate behaviors, and also tended to seek shelter during the eclipse. Analysis topics included study of natural predators and typical behavior in the wild, as well as discussion of biological rhythms like circadian and endogenous rhythms, while keeping in mind the study's lack of replication.

Measuring Nationwide Atmospheric Changes During the April 8th, 2024 Total Solar Eclipse Using a Series of Compact Weather Sensors

David Horne*
Gannon University

A rapid reduction in light levels from the sun and the associated changes in local temperature and pressure may result in atmospheric changes producing an *'Eclipse Wind'* (a breeze setup during a total eclipse), or potentially other atmospheric effects. Our goal in this study was to capitalize on the continuous landbound spatial coverage of the 2024 total eclipse to search for evidence of the eclipse wind, measure its effects and extent, and look for signs of other atmospheric changes caused by the eclipse. Our Gannon University designed and built sensor packages were placed at seven geographically separate locations across North America from Texas to upstate New York to record atmospheric conditions along the line of totality. I will discuss the development, operation and deployment of our series of relatively low-cost atmospheric science packages. I will also present results showing the effect of the eclipse on temperature, light level, wind speed, wind direction, atmospheric pressure and humidity.

Status of the Lake Erie Fishery

Mark Haffley*
PA Fish and Boat Commission

Lake Erie is jointly managed by the five jurisdictions, Michigan, New York, Ohio, Ontario, and Pennsylvania. Pennsylvania conducts a bus route style creel survey every summer to supply information to the models along with the other jurisdictions to predict year class strength and inform population estimates. The Pennsylvania Fish and Boat Commission utilize all of this information to make responsible management decisions that impact the fishery and the users of the resource.

Evaluating the Population and Movement of Round Goby (*Neogobius melanostomus*) in Elk Creek, a Lake Erie Tributary

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Round gobies, *Neogobius melanostomus*, are an invasive fish detrimental to the stability of aquatic ecosystems, competing for space and resources with native species. While round goby are well-established in Lake Erie, their population size, demographics, and movement are unknown. Thus, this study aimed to estimate the population size, understand demographic features, such as size and sex, and assess the movement of round gobies in Elk Creek, a Lake Erie tributary, through a mark and recapture study. For 10 weeks in the Summer of 2024, nine designated 60-m sections in Elk Creek were kick-seined for 30 person minutes every week. The gobies collected in each section were measured, sexed, and given a section-specific color of a visual implant elastomer (VIE) tag. Round gobies recaptured with a tag were recorded. Throughout this study, 1545 gobies were caught, with eight recaptures. Based on the Schnabel Index, the round goby population in Elk Creek is estimated to be 133,188 (95% Cl: [78671, 433788]) gobies. There was no significant difference in the size of males and females, but juveniles were significantly smaller than both sexes and the most abundant in mid-June and mid-August. As the summer progressed, fewer gobies were collected overall and within sections. Goby size and sex did not differ significantly over the summer and between sections. Recapture data cannot indicate certain movement patterns, but suggests that significant movement is unlikely. Given this, sections abundant with goby should be targeted consistently for round goby management.

Use of eDNA as a Detection Tool for Prioritizing Invasive Round Goby Surveys in the French Creek Watershed

Casey Bradshaw-Wilson, Ph.D.[1, 2]*, Doug Fischer[3], Vicki Muller[4]
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[3]*Pennsylvania Fish and Boat Commission*
[4]*Erie National Wildlife Refuge*

Round Gobies (*Neogobius melanostomus*) were discovered in Pennsylvania's most biodiverse watershed, French Creek, in 2013. This study provides information on the use of eDNA as a detection tool, helping prioritize survey efforts to characterize range and population densities of Round Gobies. During July 2021 and 2022, water samples were collected at 60 locations, were filtered and sent to the U.S. Fish and Wildlife Service Northeast Fishery Center (NEFC) where they were processed utilizing qPCR (using two DNA markers). The 2021 results indicated range expansion on the mainstem of French Creek with detections extending to the confluence of French Creek and the Allegheny River. The 2022 findings were similar in the northern portions of the watershed, however, no detections were made in lower reaches. Results from eDNA prompted a community survey on French Creek, which was conducted in 2022 through 2024. All fishes were collected using both electrified benthic trawls and boat electrofishing gear and identified to species, providing additional baseline data on native fish communities in addition to Round Gobies. The surveys demonstrated that Round Gobies have expanded their range nearly 29 river kilometers, but at low densities (n=8). An additional survey covering another 29 river kilometers in the

lower portion of the watershed yielded no round goby detections. Round Gobies are an aquatic invasive species priority in both Pennsylvania and the United States. Effective management actions require a thorough characterization of range and population, a foundational aspect that this study provided.

Predation by Invasive Round Goby (*Neogobius melanostomus*) on Native and Introduced Bivalves in Tributaries of the Lower Great Lakes Basin in Western New York

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Speed Talk

The round goby (*Neogobius melanostomus*) is an invasive benthic fish that is widespread throughout the Great Lakes. The invasion of round goby throughout the Great Lakes is thought to have been facilitated by invasive dreissenid mussels, a key prey item of round goby. However, dreissenids are absent in many Great Lakes tributaries where the round goby continues to spread. Tributaries of the Lower Great Lakes in Western New York (WNY) are inhabited by other bivalves that may be incorporated into the round goby diet, including fingernail clams (Sphaeriidae), freshwater mussels (Unionidae), and invasive basket clam (*Corbicula fluminea*). Although recent studies revealed that round goby do consume juvenile unionids in the Allegheny-Ohio River Basin, prior studies of round goby diet in Great Lakes tributaries have generally overlooked the role of bivalves. Because the dynamics of predation by round goby on bivalves in these tributaries – particularly potential interactions between round goby, native freshwater mussels, fingernail clams, and the invasive basket clam – are poorly understood, the threat of round goby to imperiled unionids in Great Lakes tributaries may be underestimated. The objectives of this study are (1) to identify which types of bivalves are prey for round goby in the Tonawanda Creek watershed, a Lower Great Lakes tributary in WNY with a high diversity of unionids; and (2) to determine whether consumption rates directly reflect the availability (density/CPUE) of each bivalve. Gut content analysis and bivalve surveys are being used to compare observed predation by round goby to the availability of each bivalve.

Assessing Recovery of the Presque Isle Wetlands from the Invasion of Giant Reed Grass (*Phragmites australis*)

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In the summer of 2024, we continued to monitor the wetland plant communities of Presque Isle State Park. Monitoring efforts are done in conjunction with the PA-DCNR's ongoing effort to control non-native plant species and restore the native wetland plant communities of Presque Isle. Areas monitored included the Neck (at the Park's entrance), Leo's Landing, the nearshore of Niagara Pond, Thompson Circle and Thompson Bay, the wetland adjacent to the Coast Guard Station, the nearshore area of Horseshoe Pond, and Dead Pond. All areas received intensive walkthroughs. We recorded the presence, location (GPS) and abundance of all non-native/invasive plant species. Stratified random sampling was done in several of the wetlands recording species presence and cover. Select species were collected, both non-native ad native, for deposit in the Tom Ridge Natural History Museum and the John F. Lewis Herbarium at PennWest University-California. A comprehensive plant species list (all species observed) was compiled for all monitored wetlands. We continue to review the data but preliminary results indicate wetland plant community recovery in all wetlands monitored, Invasive species were present at all sites to include Phragmites, Purple loosestrife, Flowering rush, Reed canary grass and others. Phragmites was limited to small but scattered pockets but these pockets represent potential areas from which Phragmites may again spread.

Characterizing One of Western New York's Most Diverse Mussel Assemblages

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Native freshwater mussels (Unionidae) are a diverse and imperiled group of organisms with significant conservation value. The Tonawanda Creek watershed has one of the most diverse assortments of unionid mussels in western New York. Numerous surveys have been conducted in Tonawanda Creek and its tributaries to characterize these ecologically significant communities. However, most of these surveys were qualitative and do not provide density estimates and are less likely to detect juvenile mussels, which may have more specific habitat requirements. To better understand the demographics of mussel populations in western New York, we conducted quantitative mussel surveys at stream locations with known mussel presence. Additionally, we assessed habitat quality, including substrate and water chemistry, to better understand the conditions required for successful mussel recruitment. Our surveys of six sites detected 16 live mussel species and an additional 3 species as spent shells. While Tonawanda Creek itself accounted for the majority of this diversity, three of the live species were only found in Ellicott Creek, one of the tributaries. Sites had mussel densities ranging from 0.4 mussels/m^2 to 16.27 mussels/m^2, and sites with less fine sediment (high D50) had higher densities. We detected recent recruitment (mussels under 20 mm) at all but one of six sites. Our surveys show that most of the largest mussel beds in Tonawanda Creek and its tributaries are highly diverse with active recruitment. This characterization of mussel communities and their associated habitats will be informative for identifying potential conservation constraints for unionid mussels across New York State.

Are we mussel ready? Evaluating Habitat Water Quality in the Upper Niagara River for Native Mussels (Unionidae)

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The family Unionidae, commonly called native freshwater mussels, is one of the most endangered taxonomic groups in the world due to a variety of factors, including habitat degradation and declining water quality. In the Upper Niagara River, a significant number of species have been extirpated and most remaining populations are reduced in size. However, years of effort from a variety of stakeholders have improved local habitat quality. Using restored and unrestored Niagara sites as test locations and comparing them to mussel-occupied tributaries, we are monitoring growth and survivorship of confined juvenile mussels to determine whether current water and sediment quality are conducive to mussel growth and survival. Using these data, we will determine which sites can successfully support mussels, and identify abiotic factors that play the strongest role in juvenile mussel survival. We reared locally-sourced juvenile Fatmucket (*Lampsilis siliquoidea*) and distributed them in mussel silos and sediment caging at sites in the Niagara River and its tributaries and periodically assessed growth, and noted mortality events. Juveniles at Niagara River sites experienced higher mortality and lower growth than those in smaller tributaries. Juveniles in sediment caging experienced lower growth rates and higher mortality than juveniles in silos except for those in a gravelly, high-flow tributary. Preliminary results thus suggest that restored habitats are potentially sufficient for supporting mussels, and that sediment composition may be an important factor in their survivorship. These efforts will serve as the basis for future mussel conservation efforts in the area.

ABSTRACTS

Regional Science Consortium
20th Annual Research Symposium
November 6-8, 2024
Tom Ridge Environmental Center
at Presque Isle State Park

POSTER PRESENTATIONS

POSTER SESSION: Wednesday, November 6, 2024, 6pm—8pm

1. RSC Education Poster

Hailey Dahl*, Jacob Korte*
Regional Science Consortium

The Regional Science Consortium has provided enriching STEM experiences to K-12 member school districts for over a decade. The education program has continuously grown year after year, and new initiatives have risen with new opportunities. The RSC's most popular annual education events continue to be a great success, with over 300 students registered for both the 8th Annual Forensic Science Escape Room and the 9th Annual Problem-Solving Hack-a-Thon. With support from the PA DEP-Environmental Education program, the RSC has launched the "Ship and Shore Program" on Lake Erie. Educating on, and immersing students in the ecosystems of the Lake Erie and Ohio River basins has always been a priority for the RSC. The Ship and Shore Program executes this perfectly, with NOAA's MWEE (meaningful watershed educational experiences) approaches and STEELS Standards in place. With seasonal changes being apparent in the area, the RSC will host the second annual "Four Seasons of STEAM" program, with topics focusing on artistic expression in science, SCUBA techniques used in archaeological shipwreck surveys, agriculture in technology, and immersive field experiences through an overnight camping trip on Presque Isle State Park. Through grant funding from the PA Fish and Boat Commission's R3 grant program, the RSC started the *Angling Experience for Beginners* program to teach students the sport of fishing. The RSC staff received their Fishing Skills Instructor certification from the PA Fish and Boat Commission and provided the experience of fishing to over 600 students this year. To serve the high school students from RSC member school districts, the RSC also developed a Summer Shadow program, giving these students the field experiences for those interested in pursuing college degrees in Biology, Environmental Science, and other related fields. Throughout the 2024-2025 Academic Year, the Regional Science Consortium will provide programming to over 3,000 students from 13 different K-12 member school districts.

2. Applications of GIS Mapping in Forensic Anthropology: A Case Study of Migrant Mortalities in Arizona

Jordan Proffitt, B.S.+*
Department of Applied Forensic Sciences, Mercyhurst University

In the last two decades, major strides have been made in Geographic Information Systems (GIS) technology with regard to pinpointing data hotspots, correlating geospatial distributions, identifying visibility of landmarks, and more. GIS has enjoyed widespread utilization across scientific fields like ecology, climatology, and wildlife biology, but the high-caliber spatial analyses implemented in such fields are basically absent in forensic anthropology, where GIS is relegated to basic applications and GIS-driven spatial analyses are rarely applied. This presentation illustrates the potential of GIS mapping in forensic anthropological investigations, showcasing spatial data from southern Arizona, where

collaboration between local forensic anthropologists and the humanitarian nongovernmental organization Humane Borders has resulted in enhanced comprehension of the routes, strategies, and risks faced by undocumented migrants crossing the US-Mexico border. We demonstrate how GIS is used to identify migrant corridors, quantify the visibility of navigational landmarks, reveal spatial risk distributions, and measure changes in migration strategies over time.

3. The Usefulness of 3D Scanner in Indoor and Outdoor Crime Scene Reconstruction

Durand-Ortega, G.*+, Adserias-Garriga, J., Cabo, L. L.
Department of Applied Forensic Sciences, Mercyhurst University

Precision mapping and graphic documentation of the spatial distribution of evidence is essential both to reconstruct the events transpired at a crime scene, and to present analyses and conclusions in court. Outdoor crime scenes and burials are particularly challenging, as the classic criminalistic protocols, designed for indoor scenes, do not translate well to those more complex scenarios. The development of forensic archaeology during the last three decades bridged this methodological gap, with outdoor crime scene protocols that rely heavily on the integration of different mapping and documentation technologies. Current outdoor crime scene investigation combines total station, GPS, photographic, and hand-measured data to map the scene at different scales and resolutions. Data integration from these diverse sources, in both documentation and analysis, is a key element of forensic archaeological protocols. Modern 3D laser scene scanners have become increasingly affordable and offer capabilities that largely overlap those of the classic scene mapping technologies. Modern 3D scanners capture spatial data at precisions similar to those of total stations, integrate GPS data, and record photographic information. Thus showing the potential to simplify scene processing or completely substituting other technologies and methodologies. However, standard protocols are not available yet for this technology, and it is still unclear what may be its optimal application in these contexts. In this presentation we describe a series of case studies illustrating the scene 3D scanning protocols currently applied by the Mercyhurst Forensic Scene Recovery Team (MFRST) in forensic casework, discussing some of the advantages and the integration with other mapping technologies.

4. Application of Forensic Archaeology to Indoor Crime Scenes

Brailey Moeder*+, Nicole Wray*+, Jessica Cronin*+
Department of Applied Forensic Sciences, Mercyhurst University

With the increased reliance on DNA for identification of human remains in forensic contexts, forensic anthropologists have shifted their focus to include the application of archaeological methods to the processing of forensic scenes. Forensic archaeology allows for taphonomic interpretation of a crime scene through comprehensive documentation, and careful excavation which preserves the original context and association of the scene and evidence. Strict protocols for mapping, and excavation techniques ensure careful and efficient recovery of biological and physical evidence as well as processing and documentation of aspects of the forensic scene itself. Most commonly, forensic anthropologists assist law enforcement with outdoor crime scenes, which involve a variety of factors that can complicate an efficient, comprehensive recovery. Surface scattered remains, burials, and those involving thermally altered evidence are a few examples of crime scenes forensic anthropologists typically respond to. Mercyhurst Forensic Scene Recovery Team (M-FSRT) at Mercyhurst University has responded to nine scenes in the past 13 months, three of which were indoors. Of these indoor cases, two were clandestine graves in basements, and the third was within an attic crawlspace. Each indoor scene presented unique complications not encountered in the processing of outdoor scenes. The surprising frequency and variety of indoor scenes in M-FSRT's recent casework has proven that the value of forensic archaeological techniques is not limited to outdoor crime scenes. The purpose of this project is to compare the complications, workflow, and data collection of these indoor scenes to each other as well as to the average outdoor scene.

5. Geometric Morphometrics: Alternative to Non-Metric Analyses in Forensic Anthropology

Stephen D. Hostetler[1]*+

1: Department of Applied Forensic Sciences, Mercyhurst University

In forensic anthropology, there are a variety of methodologies used to estimate the biological profile (age, sex, stature, ancestry) of an individual's skeleton using both measurements and general observations of morphological differences. Most of the non-metric methods commonly used by forensic anthropologists present the issue of subjectivity in determining which morphological 'score' or 'category' most accurately describes the feature of interest. While the author of these methods may understand there to be clear delineations between scoring categories, the process of notating scoring descriptions and reader interpretation of those descriptions introduces a considerable degree of subjectivity to these analyses. Geometric morphometrics (GM) is a statistical analysis technique that allows a researcher to mathematically track the surface morphology of skeletal structures using standardized landmarks, curves, and surface wraps on a three-dimensional model. GM has been frequently used in a variety of biological fields, including evolutionary biology and paleoanthropology, but has yet to been utilized to its full potential in forensic anthropological contexts. The application of GM to commonly used non-metric analyses would allow for the transition from qualitative interpretation to an entirely quantitative estimation. Essentially, the researcher would transition from choosing between scoring categories that can be as vaguely described as "narrow, intermediate, or broad" to placing a curve or surface grid over the desired feature (in a digital model) allowing for the morphology to be mapped on a 3-dimensional cartesian coordinate space. With mathematical descriptions of changes in morphology, distinct, quantitative descriptions of skeletal feature morphologies can be established.

6. Biological Profile Assessment at the Mercyhurst Forensic Anthropology Laboratory: a comparison of statistical uncertainty and applied accuracy

Samantha M. Buck, B.S. [1]*+ and Stephanie M. Melillo, Ph.D[1]

[1]*Department of Applied Forensic Sciences, Mercyhurst University*

Most forensic anthropology case reports include a 'biological profile', which provides estimates of a decedent's sex, age, ancestry, and stature derived from skeletal observations. Today, DNA genotyping is the preferred mode of forensic identification, however, the biological profile remains a useful tool since it provides investigators with basic information about a decedent quickly and inexpensively. Methods for estimating the four biological profile components are well-documented, validated, and utilize curated skeletal collections containing identified individuals from the late 19th- and early 20th-centuries. Published accuracy rates for these methods exist, however, they are often derived from statistical measurements of uncertainty (e.g. the standard error) rather than from the application to a novel population (a validation study). Regardless, those methods and accuracy rates reflect historic populations, rather than their contemporary counterparts which differ in many ways (e.g. modern medicine, nutrition, exposure to drugs). As a result, methods created from historic samples may not be as accurate when applied to contemporary populations, since they are not designed for such populations. This study aimed to investigate the applied accuracy rates of biological profile estimates in forensic anthropological casework. Forensic cases with positively identified decedents from the Mercyhurst University Forensic Anthropology Laboratory (M-FAL; n = 50) were analyzed. For each case, one or more methods per biological profile component were observed to determine if forensic anthropologists at M-FAL accurately estimated the known component. The findings will demonstrate the performance of forensic anthropologists at M-FAL and the applied accuracy of the biological profile estimation methods.

7. Testosterone and the Implicated Risk Factors Involved in its Steady Decline

Brennan Schmitt*+, Mary Vagula, Ph.D.

Biology Department, Gannon University

Testosterone (T) is a key hormone, especially in males, where it regulates post-puberty physiological changes, reproductive health, and secondary sexual characteristics. It also affects mood, fat distribution, muscle mass, bone density, libido, and motivation. Since 1987, Testosterone levels have declined, with

infertility rates rising, likely due to environmental pollution and endocrine-disrupting chemicals. Researchers also point to obesity, poor diets, and sedentary lifestyles as contributing factors. This study examined testosterone levels among males in Erie, PA, and exploring links between these levels and lifestyle factors such as physical activity, sleep, nutrition, and comorbidities. Our preliminary observation indicates that there is a correlation between lifestyle and testosterone levels. Further analyses are underway.

8. Early-onset Alzheimer's Disease among youth

Angelina Carbo*, Praveer Singh*, He Liu, Prasad S. Dalvi
Biology Department, Gannon University, Erie, PA

Growing research identifies Alzheimer's Disease (AD) as "Type 3 Diabetes," emphasizing its close relationship with Type 2 Diabetes through impaired insulin and glucose homeostasis. Insulin resistance can lead to neurodegeneration via inflammation and amyloid-beta (Aβ) accumulation. The latest research on Aβ has been implicated as a leading cause in the pathogenesis of AD. Moreover, diets high in processed sugars and unhealthy fats during early life have been linked to increased AD risk by worsening insulin resistance. Many genetic factors, like mutations in the *APP, PSEN1, and PSEN2* genes, enhance Aβ accumulation, which has been linked to the early onset of the disease. The prevalence of exposure to pollutants and toxins such as chemical exposure, pesticides, mercury, cadmium, arsenic, and lead. Similarly, the increased prevalence of mental health issues in younger generations leads to an increased risk of AD. Furthermore, as technology and the understanding of AD expand, younger people who may have been diagnosed later in life or misdiagnosed are now being properly evaluated. These factors emphasize the importance of healthy dietary changes, stress management, and reduction of pollution exposure during youth to potentially prevent early-onset AD. This points to the need for a comprehensive approach that includes diet and stress management alongside genetic and insulin metabolism assessments in healthcare settings.

9. The Mitochondrial Genome of *Gnomoniopsis casteneae*

Carra Leavitt*+
Pennsylvania State University at Erie, Behrend College

Gnomoniopsis casteneae is an endophytic fungus known for causing cankers and stem girdling on chestnut trees. A pathogenic impact by the fungus has been detected in Europe, yet still, little is known about its host range or pathophysiology. This study aims to investigate what genes and proteins are present in the mitochondrial genome of *G. castenea* by exploring its genetic relationship to other fungi. The draft genome of *G. casteneae* was recently completed by the Department of Energy (DOE) in collaboration with Emily Dobry, a graduate student at Penn State Behrend. In this study, the mitochondrial genome from the DOE sequence was compared to other fungal sequences found in the National Center for Biotechnology Information (NCBI) database. Comparison between mitochondrial genomes was performed using BLAST analysis to find closely related species. Related sequences were uploaded to the Galaxy web-based platform and aligned using MAFFT. MAFFT resolves have indicated the most closely related species as *Chrysoporthe deuterocubensis*. Currently, gene position and structure within the G. casteneae mitochondrial genome is being determined using the fully annotated mitochondrial genome of *C. deuterocubensis*. Understanding the mitochondrial genome is just the beginning of understanding the biology of this fungal pathogen. This information is crucial as this fungus continues to cause economic loss in the chestnut industry.

10. Characterization of Endophytic *Sphingomonas* Species Isolated From Plant Flowers & Fruits

Syndey Wiegand*+, Rajinikanth Mohan
Department of Biology, Mercyhurst University, 501 E 38th St, Erie, PA

Sphingomonas is an uncommon aerobic Gram negative bacteria that contains glycosphingolipids in the cell membrane and is known to be an abundant bacterial genus in litter-degrading communities of many ecosystems and can promote plant growth or cause disease. Little is known about the role of

Sphingomonas species as endophytes in plants. To address this, in this study, we selected three strains of *Sphingomonas* isolated from fruits and flowers and identified through 16S RNA sequencing. In order to find the similarities and differences between the three isolate strains of *Sphingomonas*, we tested temperature tolerance, salt tolerance, UV fluorescence, and tested for the presence of oxidase and catalase. All three strains have shown the same results, with low temperature tolerance, low salt tolerance, and no UV fluorescence. All three strains tested positive for both oxidase and catalase. Upon isolating the three strains, visible differences were seen in color and texture, pointing towards the likelihood of the strains being different species. Future experiments include biochemical tests to understand the differences between the isolates which may reflect adaptations to their unique environments.

11. Endobacteria Isolated from Wild Mushrooms Provide Insights into Bacterial-Fungal Interactions

Hannah Bojczuk*+, Brice Hansen*+, Rajinikanth Mohan
Mercyhurst University, Department of Biology, Erie, PA 16546

Wild mushrooms and bacteria are both needed in the environment for nutrient cycling and the overall health of the ecosystem. However, how they interact with each other and how they impact the environment together is understudied. In particular, there is very little information about endobacteria residing within mushrooms and how they impact the mushrooms. To identify and understand bacteria endogenous to mushrooms, we performed numerous tests on different strains of bacteria that we isolated from ten different wild mushrooms. Using 16s ribosomal RNA sequencing, we found one species of bacteria, *Ewingella americana*, that was isolated from 70% of the mushrooms, which suggests that there are similar bacteria found within diverse mushrooms. Using the citrase slant test, we found that the majority of bacteria isolated were positive for the enzyme citrase, which suggests that the bacteria may use citrate as an energy source. We also found that several of the bacterial isolates from mushrooms were surprisingly cold tolerant, being able to grow at freezing temperatures (0°C), suggesting that wild mushrooms tend to harbor cold tolerant bacteria. Using Pikovskayas agar to test phosphatase activity, we found that many of the bacteria were able to digest phosphate which suggests that the bacteria may be aiding the mushrooms' growth through phosphate solubilization. The future of understanding mushrooms and their endobacteria is important because they directly impact nutrient cycling in the environment and mushrooms are also increasingly consumed as a food crop.

12. The Role of SCAMP3 in CXCR4 Trafficking

Madylin Leach*+, Haley Poe
Gannon University

The CXC-Chemokine Receptor Type 4 (CXCR4) is a G-protein coupled receptor involved in regulating cell growth, division, differentiation, movement, and migration. When the agonist CXCL12 binds to CXCR4, it initiates ubiquitin-dependent endocytosis, directing CXCR4 through the endolysosomal pathway for degradation. Failure to degrade CXCR4 in the lysosome can lead to its overexpression, which is associated with cancer metastasis. This study investigates the role of Secretory Carrier Membrane Protein (SCAMP) 3 in the endolysosomal trafficking of CXCR4. SCAMP3 interacts with AIP4/ITCH, a ubiquitin ligase that regulates CXCR4, as well as with the ESCRT proteins Hrs and Tsg101, which facilitate CXCR4's transport from the early endosome to the lysosome. To evaluate SCAMP3's impact on CXCR4 trafficking, we will use RNA interference (RNAi) to knock down SCAMP3 and then examine effects on CXCR4 following agonist stimulation. Two assays will be used: immunofluorescence to track CXCR4 trafficking to lysosomes and western blotting to assess receptor degradation.

13. *trans*-Golgi Network and Endosomal Adaptors are Required for ATP-Dependent but not Nitrogen-Specific Growth in *Saccharomyces cerevisiae*

Mariam Alkhafaji*+, Hannah Barnett, Ellen Madden, Mia Krevh, Rachel Stubler, and Quyen Aoh, Ph.D.

Department of Biology, Gannon University

In the yeast *Saccharomyces cerevisiae*, the trafficking of proteins between the cell surface, *trans*-Golgi network (TGN), endosomes, and vacuoles is regulated by clathrin adaptors. This study investigates the roles of the TGN-endosomal clathrin adaptors in nitrogen-regulated growth. We found that specific combinations of clathrin adaptors are necessary for growth. Given that defects in nitrogen permease trafficking may underlie these growth issues, we explored how different adaptor combinations influence growth across various nitrogen sources. Our results indicate that single deletions of ENT3, ENT5, or APL2 (AP-1 subunit) do not affect growth in either preferred or non-preferred nitrogen sources. However, double deletions of ENT3 and ENT5 (but not APL2 with either ENT3 or ENT5) resulted in reduced growth in both nitrogen conditions. A triple deletion of ENT3, ENT5, and APL2 led to the most significant growth defect under both nitrogen sources. These findings suggest that Ent3 and Ent5 are functionally redundant and complementary to AP-1, with all three being essential for optimal cell growth. Notably, the role of these clathrin adaptors in cell growth does not appear to be directly linked to the regulation of specific nitrogen permeases, implying a broader function in cellular processes that may influence metabolism and cell cycle regulation. To further investigate this, we assessed the impact of adaptor deletions on cellular ATP levels. We observed reduced ATP levels in double and triple mutants, not in single mutants, suggesting a novel role for clathrin adaptors in regulating metabolism, potentially through modulation of signaling pathways that influence cellular energy levels.

14. Effectiveness of Cinnamaldehyde Combinations against Methicillin-resistant *Staphylococcus aureus*

Esther Luo*+, Nancy Carty, Ph.D., Christopher C. Keller, Ph.D., FNAOME, Robert Waters, Ph.D.

Lake Erie College of Osteopathic Medicine

Methicillin-resistant *Staphylococcus aureus* (MRSA) causes nosocomial and community-acquired infections, including cellulitis and sepsis. The continued prevalence of MRSA warrants further exploration of alternative therapeutic approaches. Previous studies have demonstrated that cinnamaldehyde (CA), a key component of cassia bark oil (CBO), effectively inhibits the growth of MRSA. The aim of this study was to determine if combining CBO, tea tree oil (TTO), red thyme oil (RTO), or their components, thymol (THY) and carvacrol (CARV), with CA would produce a synergistic effect on MRSA growth inhibition. The zone of inhibition (ZOI) for each essential oil or component was determined using the Kirby-Bauer disk-diffusion assay. Dilutions of each oil or component was mixed with 70% EtOH and was assessed for their individual inhibitory effects against MRSA. Each compound was then combined with CA and compared to undiluted CA to evaluate potential synergistic effects. Statistical significance was assessed using the Kruskal-Wallis test, followed by Dunnett's post-hoc analysis. Most essential oils and components, when combined with CA, resulted in significantly lower MRSA inhibition compared to CA alone, except for CBO/CA, which did not differ significantly. RTO alone exhibited the largest inhibitory effect. The results indicate that combining essential oils or their components with CA reduces the effectiveness of CA in inhibiting MRSA growth in vitro. Future studies should investigate CA's impact on clinically isolated MRSA to evaluate its potential in treating MRSA infections.

15. Comparison of Essential Oils on Growth Inhibition of *Streptococcus pyogenes*

Ivan Hutchison*+, Christopher C. Keller, Ph. D., FNAOME, Robert Waters, Ph. D., Nancy Carty, Ph. D.

Lake Erie College of Osteopathic Medicine

Streptococcus pyogenes is a major bacterial pathogen that has approximately a 15% carriage rate and is responsible for a variety of illnesses and infections, ranging from minor infections to life-threatening diseases. Given the prevalence and potential danger of this pathogen, the increase in bacterial antibiotic resistance is a major concern, thus raising the need for seeking alternative forms of treatments. The aim of this study was to investigate the antibacterial effects of 40 different essential oils against a strain of *S. pyogenes*. The zone of inhibition (ZOI) for each essential oil tested against *S. pyogenes* was determined using the Kirby-Bauer disk diffusion assay on a Brain Heart Infusion (BHI) agar. The BHI plates were incubated at 37ºC for 24 hours after inoculation of the bacteria. 40 essential oils were tested throughout this experiment, in triplets. One essential oil, Lemongrass, was tested at 100%, 50% and 25% concentrations. The ZOI of the essential oils tested were measured and compared using a Kruskal-Wallis test, followed by a Dunnet's post-hoc test to determine statistical significance. Cinnamon Cassia, Lemongrass, Lemongrass at 50% concentration, Oregano, Red Thyme, and Thymol oils were the most effective for inhibition of *S. pyogenes* growth. Lemongrass displayed the highest ZOI average, 85mm, and was then diluted to 50% and 25%, with 50% dilution having an average ZOI of 45.83mm, higher than 33 of the other 39 essential oils tested. A statistically significant difference in ZOI was determined between the three dilutions of Lemongrass as well as between the top three essential oils: Lemongrass, Red Thyme and Thymol compared to the next highest three essential oils: Cinnamon Cassia, Oregano and Lemongrass at 50%. The findings of this study displayed the antibacterial effectiveness of Cinnamon Cassia, Lemongrass, Lemongrass at 50% dilution, Oregano, Red Thyme, and Thymol essential oils against the growth of *S. pyogenes* grown in vitro. Therefore, the utilization of these oils as alternatives to antibiotic treatments against *S. pyogenes* is possible.

16. Identification of Downy Mildew Strains Resistant to Strobilurin and CAA

Nyla Zorbas*+

Penn State Behrend

Downy mildew (*Plasmopara viticola*) is a significant threat to the grape and wine industry in Northeast Pennsylvania, affecting both leaf tissue and grape clusters and leading to necrosis if untreated. The common use of Strobilurin and Carboxylic Acid Amide fungicides to manage this pathogen has resulted in resistance due to prolonged application. This study aims to detect quinone outside inhibitor (QoI) resistance, associated with the G143A mutation, and carboxylic acid amide (CAA) resistance, linked to the G1105S mutation, in downy mildew strains from the Lake Erie Grape belt including wild grapes, to develop more effective control strategies. Infected leaf samples were collected, sterilized, and treated with five different fungicides. Spore solutions were obtained by pipetting autoclaved water onto fungal lesions. DNA was extracted from the spores and amplified using polymerase chain reaction (PCR). QoI resistance was assessed using forward primers CytbQForMut and CytbQForWT, along with a shared reverse primer CytbQRev. CAA resistance was tested with two outer primers (Cesa3OF and Cesa3OR) and two inner primers (Cesa31W and Cesa31M). Four PCR reactions were performed per sample to test the QoI and CAA primers. Further DNA sequencing will be necessary for comprehensive analysis.

17. Genetic analysis of *Bacillus subtilis* Reveals Novel Regulators of Tolerance to High Salinity

Annabel Arhin*+, Rajinikanth Mohan

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Bacillus subtilis is a gram-positive bacterium that is ubiquitously present, with a demonstrated ability for tolerance to high temperature and salinity. However, little is known about the which of its 4,200 genes are involved in conferring tolerance to high salinity. To uncover new players regulating salt tolerance, I performed a genetic screen comparing the wild type *Bacillus subtilis* with 38 different mutants of candidate genes from an RNA sequencing experiment of heat-stress. I found 8 mutants involved in

diverse processes including quorum sensing, cell wall biosynthesis, transcriptional activation, cysteine and glutamate biosynthesis, thiamine salvage and catabolite repression to be defective in growth on high salt media. Many of these genes have reported in stress responses previously, but some of them have not been implicated in tolerance to salinity stress. The genes corresponding to these mutants will be tested for their induction by salinity stress and will be further characterized through genetic complementation and biochemical experiments to uncover potentially novel pathways of tolerance to salt stress.

18. Does potato seed treatment with 1,4-dimethylnapthalene alter drought tolerance?

Emily Dobry, M.S.*+
Ag. And Env. Plant Sciences, The Pennsylvania State University

1,4-dimethylnapthalene (DMN) is a sprout suppressant commonly used on potatoes (*Solanum tuberosum*) destined for either commercial use or as seed for the next crop. Previous studies, which evaluated the response of dormant potatoes to DMN exposure, observed significant increases in transcription of stress related genes. In particular, those related to drought stress response were among the most highly represented genes induced by DMN treatment. The goal of the current study was to assess whether treatment of seed potatoes with commercially relevant levels of DMN prior to planting alters drought tolerance. Seed potatoes of two russet cultivars, King and Caribou, were placed into sealed 50-gallon drums and treated with either 10ppm DMN or nothing, then stored for one month. Seed potatoes were then cut and planted in randomized blocks inside of a hoop house, with six replicates per treatment, cultivar and stress condition (irrigated or drought). All plants were watered regularly until flowering, at which time the drought study was initiated. Weekly, the irrigated plants received one inch of irrigation, while the drought plants received half an inch. Prior to bloom plants were assessed for stem count, above and below ground fresh biomass, time to 50% emergence, and time to 50% bloom. At harvest, total yield, yield per size category, internal defects, and specific gravity were recorded. The effect of cultivar, treatment, condition and potential interactions will be analyzed to determine whether DMN seed treatment results in significant differences to important developmental benchmarks.

19. Analyzing the Effects of 1,4-DMN Exposure on Arabidopsis thaliana

Ian Costello*+
Penn State Behrend

1,4-Dimethylnaphthalene (1,4-DMN) is a commercial sprout inhibitor that has been used since the 90's. In industry, 1,4-DMN is used on potatoes to induce an artificial state of dormancy for long term storage; however, the chemical is not well understood. Due to this lack of knowledge, we want to explore the underlining genetic mechanisms of 1,4-DMN using the well-established model organism *Arabidopsis thaliana*. In this experiment we treated six groups of Arabidopsis with 135ul of 1,4-DMN administered via gas chamber and six groups of Arabidopsis with 135ul of deionized water via the same method. Both groups were treated for 48 hours and then were removed from chambers upon which, half of the control and half of the treated seeds were immediately flash frozen via liquid nitrogen and were stored at-80C. The remaining samples were watered daily with 200ul of deionized water and their germination was monitored with each watering. We observed that the samples treated with 1,4-DMN germinated at a faster rate than those that were treated with just water. When treated samples reached over 50% germination rates, they flash frozen in liquid nitrogen and stored at -80C. RNA was extracted from all samples and sent off for sequencing. We plan on examining gene expression changes using the RNA sequences mapped to the Arabidopsis genome. We hope that the use of the Arabidopsis well-established genome can shed light with regards to some of the underlying mechanisms in how 1,4-DMN is able to induce dormancy in potatoes, and that this study can potentially revel new applications for the chemical 1,4-DMN.

20. How cooking methods affect polychlorinated biphenyl (PCB) concentrations in popular Lake Erie game fish

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Polychlorinated biphenyls (PCBs) are persistent organic pollutants frequently found in aquatic environments. These compounds accumulate in the fatty tissues of fish species like walleye (*Sander vitreus*), a popular target for consumption by recreational anglers. Consuming fish contaminated with PCBs poses significant health risks, such as developmental and neurological problems, immune suppression, and potential cancer-causing effects. Although consumption advisories offer guidance on safe fish intake, they often overlook how cooking methods—such as baking, frying, and smoking—affect PCB concentrations. Therefore, this study examined the effects of baking, frying, and smoking on PCB concentrations in walleye fillets collected from Lake Erie. Paired fillets from 60 individual walleye were either left raw or cooked in one of three ways prior to extraction of PCBs. Following extraction and quantification, PCB concentrations in raw and cooked fillets were compared to determine the effect of different cooking methods on PCB retention. Analysis is currently ongoing, but it is expected that cooking methods that allow fat to drain away from the fillets (e.g., frying, baking) will reduce PCB concentrations due to the lipophilic nature of PCBs. Results will be presented at the conference. This research offers valuable insights into how cooking affects PCB exposure in humans. The findings will enhance food safety measures, refine public health recommendations, and inform dietary guidelines to reduce PCB-related health risks.

21. Tick Demographics and Comparison of *Borrelia burgdorferi* Carriage Rate in *Ixodes scapularis* Ticks Collected from Presque Isle and Warren County

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Lake Erie College of Osteopathic Medicine, Erie, PA

Ixodes scapularis, the deer tick, is a carrier of *Borrelia burgdorferi*, a Gram-negative helical-shaped spirochete bacterium. This is significant because *B. burgdorferi* is a causative agent of Lyme disease. This disease initially has dermatological signs and symptoms but if left untreated can lead to severe multisystem dysfunction including the heart and nervous system. The prevalence of Lyme disease has increased of the years to approximately 63,000-476,000 cases per year. This study aims to determine the *I. scapularis* carriage rate of *B. burgdorferi* at Presque Isle (PI) versus ticks collected from Warren County (WC). Secondarily, this study examines the demographics of other invasive ticks such as the *Amblyomma americanum*, the Lone Star tick, and the *Dermacentor variabilis*, the American dog tick. Questing ticks were collected from various trails from PI by flagging in May and June 2024. After ticks were separated by species, *I. scapularis* ticks were crushed individually using a pestle followed by chloroform/phenol DNA extraction. For each tick tested the presence of tick and *B. burgdorferi* DNA was determined with specific PCR reactions followed by gel electrophoresis. The same method was used for ticks obtained from WC. A Chi^2 test was used to determine statistical significance. A total of 170 ticks were collected in the summer of 2024 from PI. Of the 165 ticks, there were 42 adult *I. scapularis*, 15 *I. scapularis* nymphs, 26 adult *D. variabilis*, 5 *D. variabilis* nymphs, 50 adult *A. americanum* ticks, and 32 *A. americanum* nymphs. *I. scapularis* ticks collected from PI had a *B. burgdorferi* carriage of 50% (21 out of 42), compared to. The carriage rate of *I.* 79.2% (19 out of 24) ticks collected in WC, however these results were not statistically significant ($p = 0.143$). This study found both adult and nymph ticks of three distinct species of ticks on PI. The carriage rate of *B. burgdorferi* in *I. scapularis* ticks collected from PI was similar to the carriage rate of previous years, and there was not statistical difference in the carriage rate of *B. burgdorferi* in ticks collected from PI compared to WC. Future studies will further examine the carriage of tick-borne pathogens in these tick species in Northwest PA.

22. Determining how space use affects exposure and toxicity of two common use insecticides

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Pesticides play a crucial role in advancing agriculture, yet their runoff poses environmental risks to non-target areas. Evidence from laboratory and field toxicity assessments confirms the harmful effects of pesticides on diverse aquatic species. However, existing evaluations of pesticide toxicity often assume uniform exposure, an assumption that not accurate under field conditions. It is increasingly recognized that behavioral patterns can influence toxicity in the context of pesticide contamination, an aspect that remains understudied. Therefore, the objective of this study was to explore how space use influences toxicity of two widely used insecticides, bifenthrin and permethrin, on sediment toxicity to *Hyalella azteca*. Glass beakers were modified with steel rings to create exposure arenas with contaminated sediment placed either inside, outside, or both inside and outside the ring, resulting in three unique conditions for 48 h toxicity tests with *H. azteca*. For both bifenthrin and permethrin, pesticide placement influenced exposure and resulting toxicity to *H. azteca*. Placing pesticides within the steel ring resulted in higher lethal concentration 50 (LC_{50}) values, indicating reduced mortality rates. Conversely, lower LC_{50}s were recorded when contaminated sediment was placed outside or both inside and outside the ring. This suggests that *H. azteca* preferentially spend time in contact with the outside edge of the beaker, leading to higher exposure and increased toxicity when pesticides were placed outside the steel ring. As such, our results suggest space use is a major factor in predicting pesticide exposure and toxicity and should be considered in the development of laboratory toxicity tests.

23. Exploring Microbial Eradication using HELIOS: Implications of an Ultraviolet Light Chamber in a Microbiology Classroom.

Mitchell Marsh*+, Matt Gacura, Gary Vanderlaan

Gannon University, Dept. of Biology

Non-ionizing ultraviolet (UV) irradiation is an important part of the operation of modern-day health care facilities due to its antimicrobial properties. UV treatment sterilizes surfaces by instilling lethal mutations into the genomes of microorganisms. There are limitations to this method, as not all microbes are impacted at the same rate due to evolutionary advantages such as production of endospores. UV light also poses potential risks when used improperly. Thus, proper training in the use of germicidal UV irradiation is a relevant component to modern healthcare education. In our study, we designed an accessible UV chamber (HELIOS) to demonstrate proper usage of germicidal UV light to Biology, Physician Assistant, and Nursing students enrolled in microbiology labs at Gannon University. HELIOS is a versatile tool that has many cross-curricular applications to give students a multifaceted understanding of UV sterilization. First, students donned safety equipment, labelled their plates, and treated half of the plate with UV light. The exposure time varied based on the treatment group they were assigned. Students then incubated their plates at the microbes' optimum growth temperatures for 48 hours. At the second part of the experiment, students recorded the relative growth of organisms across treatment times. Students observed that UV light impacted microbial growth less when they possessed specialized adaptations, such as endospores or had exceptional DNA repair systems, to evade or repair genome mutations, respectively. Overall, many students expressed excitement when interpreting their results and noted the UV irradiation lab as their favorite exercise during the semester.

24. Optimizing Growth Rates of White Rot Fungi for Sustainable Biomaterial Production.

Ojus Dalvi[1]*+, Matt Gacura[1], Gary Vanderlaan[1], Davide Piovesan[2]

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Synthetic materials, such as polystyrene, are significant waste contributors, leading to concerns with their sustainability and disposal. One promising solution are fungal-based materials, which are not only renewable but can also provide a continuous food supply. The fungal biomass cultivated in their growth is a resilient composite brick-like material, that can be sold for construction or insulation purposes. The overarching goal of this project is to repurpose waste generated by local Erie businesses into growth

substrates for white rot (wood degrading) fungi, such as *Pleurotus ostreatus* (oyster mushroom). However, there are many other types of WR fungi that could be used. In our study, we plan on quantifying the growth rates of several different species of WR fungi and determining which are the most suitable species for use in biomaterials production. Four different cultures of WR fungi have been selected for growth tests on two types of solid media: nutrient-rich potato dextrose agar (PDA), and a media like the natural substrates of WR fungi, cellulose agar (CA). Triplicate agar plates will be inoculated for each species of fungi, on both media types, totaling 24 plates. These will be monitored for growth over 1 week by taking colony diameter measurements every 24 hours. Data sets will be analyzed to statistically determine how nutrient types influence fungal growth rates, and which fungal specimens are on the fastest colonizers of ligno-cellulose substrates. Further experimentation will be performed to determine the optimal treatments to produce low-cost biomaterials.

25. Electrohydrodynamic Thrust Generation and Measurement

Nathan Schneider[1]*+, Lin Zhao[2] (faculty advisor)
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Thrust is typically generated via chemical combustion or mechanical moving parts for air and space travel. Electrohydrodynamic (EHD) thrust is generated without the need for chemical fuel or moving parts. In essence, electrohydrodynamics is the study of fluid flow under the effect of an electric field. A high voltage is applied between two electrodes of sufficiently different sized radii to cause corona discharge (electrical discharge caused by the ionization of a fluid). Rapid acceleration of ionized fluid particles between electrodes creates an EHD "wind" flowing towards the larger electrode, which causes a thrust in the opposite direction. Utilizing this phenomena, engineers have been creating applications of EHD thrust in air and space travel. The poster will summarize various designs of EHD thrusters, namely the geometry and configuration of electrodes. Also presented in the poster will be methods of generating and capturing quantitative relationships between electrode geometry and spacing, voltage, and thrust force. Current methods of thrust measurement include the use of a programmable scale, direct communication between the scale and a computer, a computer application for running experiments and capturing data, and a modifiable mechanical structure in which electrodes are arranged on. With our research, we hope to inspire more investigation into the applications of a type of thrust that requires no chemical fuel or moving parts, such as electrohydrodynamics.

26. High Gauss Field Test Fixture for Bayer

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Bayer is a German pharmaceutical and biotechnology company that has locations worldwide. Bayer focuses on innovation in agriculture and healthcare to address issues around the world. Our project aims to work hand in hand with Bayer staff and engineers to design a High Gauss Field Test fixture for their MRI machines. The purpose of this test fixture is to test how PCBs and electromechanical components react whenever exposed to a magnetic field. By testing the PCBs and electromechanical components before they are placed in the instrument, it saves Bayer time and money by decreasing the downtime of the machines and ensuring that the proper components are being installed into their MRI machines. Currently, our design plan is still in development as we discuss with the Bayer engineers and research how to create the High Gauss Test Fixture. This plan takes into consideration the effectiveness of our design, the safety of the Bayer employees who would be operating our instrument, and the savings that it could bring to Bayer. At this point in the design process, we are narrowing down how to generate the magnetic field, the power it will require, and how to hold the PCBs and electromechanical components in place during testing. The magnetic field of 7 Tesla will be created by either using neodymium magnets or

a solenoid coil. The budget for the project is a combination of Gannon University and Bayer that is yet to be determined and is on track for completion by Spring 2025.

27. Water Collection Unit at Because You Care Animal Shelter

Anna E Grychowski[1], Gavyn K Hansotte[2]*+, Ryan M Osche[3]*+, Nathan T Schneider[3]
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Because You Care is a local non-profit animal rescue and fostering organization in Erie, Pennsylvania. The goal of our project is to engineer a system that collects, stores, and distributes rainwater for the client's memorial garden. The shelter has had a challenging time collecting enough water to keep up with normal activities, let alone enough to maintain a garden. The Scholars of Excellence in Engineering and Computer Science (SEECS) senior group has finished the design plan, which takes cost, safety, and durability into account. We estimated the water needs for the garden accordingly and selected the pumps to ensure adequate waterflow. The design includes one 275-gallon tank with a concrete-paver base for rainwater storage. The base will be constructed by leveling out the ground and putting down a layer of sand, then gravel, then 1 ft^2 concrete pavers. For collecting rainwater, a pipe will be connected to the downspout on the south side of the building that will lead to the water collection tank on the north side. To account for overflow, the pipe is supported by hooks screwed into the metal siding of the building to hold the water as it builds up in the pipe and flows into the gutter's existing drainage pipes. There will also be upstream filtration to weed out major debris blockages. For aesthetic purposes, a cover will be designed to go over the tank. The budget for the project is around $1000.00 and is on track for completion by mid-Spring of 2025.

28. Recycling Boat Shrink-Wrap from the Erie Bayfront

Reed Edgar*, Kyle Westfall*, Lexi Mobilia, Abby Moskala, Lexi Stevwing
Gannon Scholars of Excellence in Engineering and Computer Science

The Erie Bayfront is home to hundreds of boats which are covered by single-use shrinkwrap, used to protect boats from harsh weather during the winter. This project aims to collect used boat wraps and engineer them into multi-use products to reduce waste. This project has the opportunity to be carried out for multiple years and on a larger scale. This process involves collecting, cleaning, and drying used boat wraps. They will then be melted and pressed into a disk of material. Later, these plastic disks will be converted into various products, such as coasters or flowerpots with the potential for larger products like chairs or tables. This project also aims to raise awareness in the boat-owner community in order to encourage waste reduction and encourage their participation. It also aims to explore long-term sustainability measures.

29. From Coal Waste to Clean Water: Assessing CFOAM's Potential in Stormwater Treatment Systems

Anna Grychowski*+, Elijah Rupert*+, Elijah Cincinnati*+, Varun Kasaraneni Ph.D., P.E.
Gannon University

CFOAM, a carbon foam material derived from coal waste, has become an effective alternative to conventional materials due to its unique characteristics and wide range of uses. Produced through the thermal decomposition of coal at high pressures and temperatures, CFOAM transforms hazardous coal waste into a material that can be used in structural, thermal, and potentially environmental applications. The goal of this project is to evaluate the feasibility of using CFOAM in stormwater treatment systems. By conducting a series of comprehensive leaching and adsorption tests, we aim to assess CFOAM's ability to filter and manage stormwater contaminants. These initial evaluations will provide crucial

insights into the material's adsorption capacity, durability, and overall performance in stormwater treatment applications. Upon confirming the viability of CFOAM, the project will advance to designing a Best Management Practice (BMP) system that integrates CFOAM as a key filtration component. Additional testing will be conducted to refine the system, ensuring optimal performance under various flow conditions and water quality scenarios.

30. Stormwater Drainage Management at Gannon University

Cristiano Caserta, Arpan Uprety*+, Evan Beglin, Christian Cole, Blaise Cunningham, Zoey Herrera, Marcus Johnson, and Jeremiah Pugh, Gannon University
Gannon University

Gannon University is a non-profit catholic university based in Erie Pennsylvania. The campus is home to 3,091 undergraduate students, and 4,665 students enrolled. Erie Pennsylvania rests upon the shore of Lake Erie, leaving it vulnerable to intense and unrelenting flooding. While there are many storms drains on campus, the lack of management leads these drains to fill with debris and get clogged which prevents them from working correctly. Erie county offers tax credits to companies and organizations, in accordance with Act 167. Gannon University needs the drains to be clean to comply with this ordinance. We, the SEECS (Scholars of Excellence Engineering and Computer Studies), were tasked with engineering a solution for this problem. The budget for this project is undetermined at this time, as we have just concluded the first round of raw data collection. We plan to have a solid design ready to be prototyped by this time next year and begin prototyping by Winter 2026.

31. Making the Most of Every Drop: Supporting a Greenhouse Utilizing Stormwater

Jeanette Schnars, Ph.D.* and Jen Salem*
Regional Science Consortium

Stormwater runoff in an urban environment can transport pollutants, excessive nutrients, and litter to adjacent waterways. The implementation of stormwater management best management practices (BMPs) can reduce the impact of runoff to water quality and the flora and fauna that inhabit this ecosystem. Through support of a PA DEP Growing Greener grant, stormwater BMPs are currently being implemented on the Gannon University campus. These BMPs include removing impervious surfaces, and the installation of rain gardens, rain barrels, and a rain capturing cistern. Many of the BMPs are located at the new campus greenhouse site (Myrtle Street & West 4th Street). This site includes an automated environmentally controlled greenhouse (71' x 21') providing 1,512 sq. ft. of growing space and an educational support building. The greenhouse will grow plants for wetland and dune restoration projects, and native plants for local native gardens. A rain garden, pollinator garden, and native garden have been installed on the site. Rain barrels will be installed on the educational building and a large rain cistern will be installed on the greenhouse. These BMPs will prevent excessive rainwater from entering the storm drains and the captured water will be used to water the plants in the greenhouse. Educational community programming will include a Rain Barrel Workshop and Rain Garden Workshop in April and May.

32. Impact of Aging Distribution Systems on Drinking Water Quality in Older Homes: A Comprehensive Analysis

Kristen Heflin, Padma Chapagain, Pavani Gadari, Liu Cao*
Environmental Science and Engineering, Gannon University

The distribution system, which delivers water from treatment facilities to consumers' taps, plays a crucial role in preserving water quality, especially in older homes where aging infrastructure increases the risk of contamination. This study examined water quality in 150 homes of varying ages, supplied by both municipal treatment facilities and private wells, using first-draw/stagnant sampling to capture potential contaminants. Key water quality parameters, including pH, conductivity, heavy metals, total organic carbon, and microbial counts, were analyzed. Results showed that three samples exceeded the EPA standard for lead, all from homes built before 1985, indicating possible lead plumbing. Additionally, some well samples had arsenic levels above recommended limits, though most samples met water quality

standards. The next phase will involve 16S rRNA gene sequencing, which analyze the microbial communities in the samples, to explore the relationship between water quality, infrastructure age, and microbial populations, providing potential health risks and informing effective water management practices. By identifying specific vulnerabilities, this study aims to inform policies and infrastructure upgrades to ensure safer drinking water and protect public health.

33. Exposure to Microplastics Increases Natural Transformation Efficiency in *Campylobacter jejuni*

Liu Cao[1]*, Ximin Zeng[2], Jun Lin[2]
[1]*Gannon University*, [2]*University of Tennessee*

Campylobacter jejuni is a leading zoonotic bacterial pathogen responsible for human enteritis in the US and other developed countries, exhibiting significant strain diversity due to horizontal gene transfer. The natural competence of this organism significantly contributes to the evolution of bacterial pathogenesis and antimicrobial resistance. Recent research indicates that microplastics and nanoplastics (MNPs), prevalent environmental pollutants, may enhance horizontal gene transfer in bacteria, posing a threat to public health. We hypothesized that MNP exposure could enhance the natural transformation efficiency of *C. jejuni*. Using a biphasic method, we determined the natural transformation frequency of *C. jejuni* NCTC 11168 exposed to various MNPs (polystyrene, polyethylene, and polyvinyl chloride) of different sizes (25 nm to 125 μm) and concentrations (10, 20, and 50 μg/mL). Our results showed that the presence of 50 μg/mL polystyrene, regardless of particle size, significantly ($P < 0.05$) increased natural transformation frequencies (up to 11-fold) when using a kanamycin resistance marker. However, polyethylene, polyvinyl chloride, or lower concentrations of polystyrene did not significantly alter transformation frequencies. In the case of the erythromycin resistance marker (mediated by a point mutation), exposure to 50 μg/mL of polystyrene and polyethylene significantly enhanced transformation frequencies by 3-fold and 6-fold, respectively, while polyvinyl chloride showed no significant effect ($P > 0.05$). These findings suggest that MNP exposure could enhance the natural transformation frequency of *C. jejuni*, influenced by the size, concentration, and type of MNPs. This study highlights the potential role of environmental pollutants in accelerating the spread of antibiotic resistance, posing further challenges to public health and food safety.

34. Contrasting Bacterial Community Structures in Urban vs. Rural Streams of Erie, PA.

Brooklynn M. Murlin*+, Matt Gacura, Chris Dempsey, Gary Vanderlaan
Gannon University, Department of Biology

Anthropogenic activities, such as pollution and river channelization, can impact biological community composition and diversity. While these changes are often evident in macroscopic organisms like fish or macroinvertebrates, microorganisms, despite being crucial to many environmental processes, are understudied and little is known about what organisms are present and how they respond to anthropogenic change. Alterations in microbial community structure can lead to reduced ecosystem resilience, affecting biodiversity, food security, and water quality. Erie, PA with its long history of industry and urbanization provides an ideal environment to test out the impact that these activities have on bacterial communities. In our study, we analyzed four streams near or in the city of Erie to assess the impacts of urbanization on bacterial community composition and diversity.

Triplicate water samples were collected from four streams in December 2023 and September 2024. West Cascade and McDaniels Run flow primarily through urbanized areas, whereas Crooked Creek and Racoon Creek are in more rural and forested watersheds. A YSI water quality sonde was used to collect environmental characteristics (pH, water temperature, specific conductivity, and dissolved oxygen) at each site. Samples were filtered, and DNA extractions performed on each filter using a commercial kit. Illumina barcoding was then performed on the 16s rRNA gene from each sample. Results from December indicate a diverse bacterial community at all four sampling locations. Differences were clearly detected between the communities found in the urban streams versus rural streams. Analysis is ongoing for September samples, with barcoding taking place in October 2024.

35. Comparing the Water Quality and Microbial Ecology of an Urban and Rural Stream

Andrew Samuels*+, Liu Cao
Environmental Sciences and Engineering, Gannon University

Research has highlighted the differences in water quality between rural, suburban, and urban streams, with urban streams typically exhibiting higher biochemical oxygen demand (BOD) and total suspended solids (TSS) and elevated fecal coliform levels compared to rural streams. These parameters, while crucial for assessing the health of freshwater ecosystems, neglect to study the differences in microbial communities which are key indicators of stream health. To solve this, the aim of this study is to compare the water quality, and the microbial communities found in an urban stream (Mill Creek) and a rural stream (Twelvemile Creek), which are both tributaries to Lake Erie with similar watershed sizes and lengths. Parameters including heavy metals, nutrient (nitrate and phosphate) levels, total organic carbon (TOC) and *e. coli* and total coliform counts were analyzed from surface water samples collected from five sites along each stream. Additionally, 16S rRNA gene sequencing will characterize and compare the diversity and composition of microbial communities in these streams. This ongoing study will grant insights into the effects of urbanization on stream health, providing information for future remediation and conservation efforts in the Lake Erie watershed.

36. Monitoring Multiple Cyanotoxins Along the Pennsylvania Coastline of Lake Erie

Sarah Magyan*
Regional Science Consortium

Although Lake Erie is known for its chronic HAB events in the western basin, the Pennsylvania waters of Lake Erie also frequently experience HAB events. The Regional Science Consortium has been monitoring cyanotoxins (Microcystins/Nodularins, Anatoxin-a, Saxitoxin, and Cylindrospermopsin) since 2014. Water samples were collected weekly from 33-42 sites along the PA shoreline of Lake Erie, Presque Isle Bay, inland lakes, and drinking water facilities. Samples were analyzed by algal toxin ELISA plates using Abraxis/Gold Standard Diagnostics kits. Results were typically provided the same day of sampling or within 24 hours to PA Department of Conservation and Natural Resources, Erie County Department of Health, Erie Water Works, and North East Drinking Water Facility. Signage was posted at sampling sites that exceeded safe dog, human advisory, and human restriction thresholds according to the Lake Erie Harmful Algal Bloom Monitoring and Response Strategy. As part of these efforts to improve understanding of the HABs in our area, the RSC will be implementing a new technology called BloomOptix which uses an AI model to identify algal species present in samples.

37. Impacts of Rock Salt Application on Heavy Metal Leaching in Mill Creek, Erie PA

Erin Platz*+, Bella Gambini*+, Dr. Hwidong Kim
Gannon University

Erie, Pennsylvania, located on the coast of Lake Erie in the "Snow Belt", receives heavy snowfall resulting in approximately 160,000 tons of sodium chloride, or rock salt, being used to keep roadways safe. The presence of sodium chloride in aquatic ecosystems can leach heavy metals from sediment, impacting environmental and human health. This project aims to assess the temporal change in chloride concentration and its effect on heavy metal concentrations, specifically lead and arsenic, in Mill Creek, a highly urbanized stream in the city of Erie, that flows directly into Lake Erie. Three locations along the stream will be tested before and after snow season, where road salt is applied and may potentially enter the stream from melting snowpack. The first samples taken during the pre-snow season will be used to get a baseline for the concentrations of heavy metals and sodium chloride already present in Mill Creek. During the snow season, snowpacks piled on curbsides will be sampled and analyzed for concentrations of chloride and heavy metals. As snowpacks melt in early spring, samples will be taken from the same locations to note any changes in heavy metals and chloride in the aquatic ecosystem. These concentrations will be evaluated to interpret the potential effects on environmental and public health.

38. Assessing Heavy Metal Contamination around the Erie Coke Plant with the use of Geographical Information Systems

Haleigh Manning*+, Maddy Wheatley*+, Dr. Hwidong Kim
Gannon University, Environmental Science[1], Marine Biology[2], Environmental Science and Engineering[3]

This study highlights the impact of heavy metal contamination in local soil and sediment surrounding the Erie Coke Plant in Erie, Pennsylvania with a focus on the environmental impacts of improper storage and disposal methods. This will be investigated and analyzed through the use of physical sampling and usage of Geographical Information Systems (GIS) to identify heavy metal concentrations in the soil and sediment within a 3-mile radius of the Erie Coke Plant. GIS software including ArcMap will be used to visualize the environmental impacts of heavy metal leaching and to accurately show sampling locations within the study area. This research emphasizes the necessity of substantial remedial plans and possible governmental regulations and/or assessments required to lessen the effects that past industrial activities are still having on the ecosystem.

39. Assessment of Artificial Reef Habitat on the Monongahela River, implications for Lake Erie

Abigail O'Farrell*+, Emma Gowton, David G. Argent, and Connor Haskins
PennWest University

The US Army Corps of Engineers (USACE) removed Elizabeth Lock and Dam from the Monongahela River in July, 2024. To mitigate for the loss of artificial habitat (tailrace) created by the dam, they installed 72 artificial reef structures. During the summer and fall, we assessed a select number of reef and adjacent non-reef sites to determine their use by aquatic organisms. In addition, we fished reef and non-reef sites to determine their ability to attract game fishes. Using a Remotely Operated Vehicle (ROV), we captured video of each reef and non-reef habitat and quantified fish species (by species and abundance). As summer progressed, many reefs were occluded with vegetation, making video capture difficult. In addition, the USACE kept the pool created Elizabeth L/D very low, making it impossible to launch a boat. Therefore, we used canoes and kayaks to reach our sites. We identified Smallmouth Bass (*Micropterus dolomieu*) as the dominant species using the reef along with schools of minnows (likely Emerald Shiners (*Notropis atherinoides*). Fishing further confirmed the use by game fishes when compared to non-reef sites. This novel sampling technique rarely used in freshwater environments offers great promise in Lake Erie with its clear lake bottom and regions unincumbered with vegetation.

40. An Evaluation of Trout Habitat in French Creek and the Surrounding Watersheds

Thia Ferdabar[1]*+, Josh Huang[1]*+, Lorenzo Tovanche[1]*+, Josephine Reiter[1]*+, Mark Kirk[1]
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The Unassessed Waters Initiative by the Pennsylvania Fish and Boat Commission is a project started in 2010 to catalog and survey smaller Pennsylvania streams in order to locate naturally reproducing trout populations. Our project was to further this initiative by continuing to survey these smaller streams within the French Creek watershed data and collect water chemistry data. The overall hypothesis was that streams with a lower temperature and pH closer to 7 will be more habitat able for trout. We indeed found trout in colder streams, but streams with trout had slightly higher pHs than streams without trout. Our results ran counter to our proposed hypothesis, and looking at the response of young-of-year trout vs. adult trout may reveal different patterns.

41. Bed bugs: Investigating native freshwater mussel (Unionidae) bed characteristics as predictors of benthic macroinvertebrate communities

Fen M. Stanczyks[1]*+, Dominic Tringali[1], Jonah A. Fronk[2], Max S. Striedl[2], Corey A. Krabbenhoft[2], Isabel Porto-Hannes[1]
University at Buffalo, 1-Department of Environmental Sciences 2-Department of Biological Sciences

Native freshwater mussels in the family Unionidae live in patchily distributed populations known as mussel beds. These beds have been associated with a greater abundance and diversity of benthic macroinvertebrates than areas with low mussel density. Mussel beds can vary significantly in species composition, diversity, size, and density, but there is little data available to determine the effects of these characteristics of mussel assemblages on associated macroinvertebrate communities. We propose testing whether mussel species diversity, size, and density within a bed determines abundance, diversity, and taxonomic composition of benthic macroinvertebrate communities. We collected samples of benthic macroinvertebrates from concurrently surveyed mussel beds in two creeks using a Hess stream bottom sampler, and we will compare macroinvertebrate abundance, diversity, and functional feeding groups across the surveyed mussel beds. Information about the features of mussel beds that support a greater abundance and diversity of macroinvertebrates can inform future ecological study and aquatic conservation and management efforts.

42. Geologic Reconnaissance Investigation of Penn's Cave - Candidate for Protection by the National Park Service

Ashleigh Frost*+, Patrick A. Burkhart Ph.D.
Department of Chemistry and Environmental Geosciences, Slippery Rock University of Pennsylvania

At the request of the National Park Service (NPS), and having been vetted by the Seneca Nation of Indians, we contributed to a geologic reconnaissance of Penn's Cave for consideration of becoming a national park. Our first task was a literature review. Then, we made a site visit with several members of the NPS, US Congressman Glenn Thompson, and Tribal Historic Preservation Officer Dr. Joe Stahlman. We toured both the cave and the animal safari. We then rendered a recommendation for whether the cave might become a national park. Penn's cave is renowned for the opportunity for visitors to tour the cave by boat. Physical restraint upon visitors by this means of access has helped to retain the cave's elaborate speleothems in a state of pristine quality. In addition, the cave offers promise for accessibility to persons with mobility challenges. Indeed, the cave has long been a popular tourist attraction, opening to the public in 1885. Its present owners have acquired lands to provide source water protection for the cave. Even before the earliest record of ownership of Penn's Cave in 1773 however, it was accessed by Seneca Indians. Legends associated with the cave have provided the namesakes of Penn State University's mascot, the Nittany Lion, as well as the geographic monikers Nittany Mountain and Nittany Valley. Since Penn's Cave offers unique features and a notable history, we supported Penn's Cave as a candidate for additional research, favoring its escalated consideration by the NPS.

43. Mosaicking the PASST: Photogrammetry with the Pennsylvania Archaeology Shipwreck Survey Team

Sean Dalton*
Regional Science Consortium

PAAST, The Pennsylvania Archaeology Shipwreck Survey Team, is a group composed of representatives from the RSC, Diver's World, Flagship Niagara League, Indiana University of PA, PA DCNR, PA DEP – Coastal Management Program, and S.O.N.S. of Lake Erie. This volunteer working group is dedicated to the documentation, preservation, scientific study, and educational promotion of Pennsylvania's underwater archeological resources. With the support of the National Marine Sanctuary Foundation, RSC staff alongside PAAST leadership, will be working towards developing 2-5 new shipwreck photomosaics, as well as 1-3 photogrammetry models of the shipwrecks themselves. Photogrammetry allows photography to be used for surveying and mapping purposes, and in this application can allow the development of three-dimensional models. In addition to the insight this will provide about the cultural history of our area, the photomosaics and photogrammetry models will be contributions towards the NOAA designation of the Pennsylvania Lake Erie National Marine Sanctuary.

44. A Mosaic of Environmental GIS Research in the French Creek Watershed

Julia DeSanto*+, Lauren Dougherty*+, Chris Shaffer, Ron Mumme
Watershed Conservation Research Center at Allegheny College, French Creek Valley Conservancy, Allegheny College

Our research revolves around the use of geographic information systems technology to collect, analyze, and present geospatial information to stakeholders and the general public in an easy to understand manner. This poster showcases the different ways GIS was used to support environmental research throughout the French Creek watershed including the development of a Web-based application for disseminating ecological data, comparing multiple methods of watershed delineation, GPS data collection of hiking trails, evaluating land use as it relates to Hooded warbler nesting sites, and capturing aerial imagery of a fen prior to treatment of invasive species of vegetation.

45. Detecting Aquatic Invasive Species Using Species-Specific Probes and Metabarcoding Protocols

Amanda Welsbacher*+, Matthew Gruwell
Penn State University, The Behrend College

Hemimysis anomala, Daphnia lumholtzi, Cercopagis pengoi, Echinogammarus ishnus, and Nitellopsis obtusa are aquatic invasive species (AIS) to the lower Great Lakes region that originated from Europe, Asia, or Africa and entered the Great Lakes region through the uptake and release of ballast water from commercial ships or other similar means. To prevent transport of these species to the upper lake region, species detection using environmental DNA (eDNA) and quantitative PCR (qPCR) with species specific probes, has been proposed as a tool for monitoring harbor and ballast water. A second method proposed for detection is metabarcoding of eDNA samples in which all species of a group a detected through high-throughput sequencing and analysis. The objective of these experiments was to use existing protocols of speciesspecific qPCR in contrast to metabarcoding techniques to determine the presence or absence of the five AIS, and which method is more reliable. We sampled eight localities across US and Canadian harbors along Lake Erie each month for five months. Sampling protocols, DNA extraction, and qPCR protocols were followed from previous established research, along with Nature Metrics metabarcoding testing to compare the two detection protocols. Results of the species-specific protocol indicate that all five AIS have been detected at a minimum of one the eight localities in both the US and Canada. Preliminary results from metabarcoding have indicated no AIS detected within the first sampling time point, but remaining time points are currently under testing from Nature Metrics. Current data suggests that species-specific probes are successful in identifying the presence or absence of a target species, making it a valuable tool for testing ballast and harbor water.

46. Assessing the impact of an invasive fish (*Neogobius melanostomus*) on Lake Erie tributaries and implications for Lake Champlain invasion

Matthew J. Scott[1*]+, Corey A. Krabbenhoft[1]
[1]The State University of New York at Buffalo, Department of Biological Sciences, Buffalo, NY, USA

The round goby (*Neogobius melanostomus*) is an invasive fish species that has spread to all five of the Great Lakes. Their expansion has negatively impacted native fishes through competition for food and habitat. However, round goby invasion has primarily been studied in lakes, with work in rivers lagging. One current concern is the potential spread into the Lake Champlain watershed. To characterize the goby's impact on native fishes in rivers and predict their potential impact on streams in the Lake Champlain watershed, we evaluated the biological and habitat characteristics of 14 stream sites in the Lake Erie and Lake Champlain watersheds, in invaded and uninvaded locations, respectively. This included collecting fish, macroinvertebrates, aquatic and riparian plants, and habitat data at each site. Muscle plugs were taken from a subset of fishes alongside macroinvertebrate and plant tissue samples to perform carbon and nitrogen Stable Isotope Analyses to determine changes in food web dynamics due to

round goby invasion. Fish assemblages in both systems were dominated by minnows, with round goby present in 6 of 10 Lake Erie stream sites. Round goby abundance ranged from 1 to 44, averaging around 8 individuals per site. The Lake Champlain assemblages currently lack round goby but have similar species otherwise, with important overlap of darters and minnows that are expected to be negatively impacted by competition with round goby. Further analyses will address the correlation between round goby density and habitat characteristics that may inform management decisions regarding invasion potential and impact on native species.

47. Discovering differences in eyespot size and color in invasive round gobies using local Erie populations

Mallory Causer*+, Sam Nutile, Lynne Beaty
School of Science, Penn State Erie - The Behrend College, Erie, PA 16563

The round goby (*Neogobius melanostomus*) is an invasive species first discovered in Lake Erie in the 1990s. The overwhelming increase in this invasive species has negatively impacted other aquatic life and has caused great concern for biodiversity in the region. Round goby success in its invasive range may be aided by its eyespots, color patterns that mimic the eye of a vertebrate to intimidate predators. Before we can determine if eyespots contribute to round goby success, we first must document variation in round goby eyespot size and color to determine if there is selection on this trait. Round gobies were collected from select areas in Erie County, and the size and color of their eyespots were analyzed using photos. Round goby eyespots occurred frequently in all the sampled locations, but the eyespots varied in size and color depending on the collection location. Collectively, eyespots occurred less frequently and were smaller in tributary goby populations compared to Lake Erie pier populations. Variation in eyespot size and color between local round goby populations suggests that this trait may have localized selective pressures and contribute to round goby invasion success. This study helps us determine the factors augmenting round goby invasion of novel habitats, distinguish round gobies from native look-alikes, and learn about the importance of an eyespot as an anti-predator defense.

48. Time to flip a switch: Documenting the presence of biofluorescence in Pennsylvania's native salamanders

Ripley Kindervater*+, Lynne Beaty
School of Science, Penn State Behrend, Erie, PA 16563

Biofluorescence, the absorption of high-energy wavelengths of light (i.e., blue) and subsequent re-emission of light at lower-energy wavelengths (i.e., green), has only recently been documented in terrestrial systems, most notably salamanders. Among salamanders, it has been documented in various families, but not on a species-specific basis. We sought to determine which salamander species fluoresced in Northwestern Pennsylvania in response to five excitation ranges, including ultraviolet, violet, blue, cyan, and green lights, as well as document fluorescent patterns observed in various life stages. After specimen collection, individuals were excited with one of five excitation lights inside a photarium, photographs were taken, and biofluorescence was confirmed using long pass filters and a spectrometer. This study is still underway, yet has documented biofluorescence in all species encountered. Furthermore, sexually dimorphic patterns of biofluorescence were notably observed in the postcloacal glands of two species of Plethodontid (*Plethodon cinereus* & *P. glutinosus*), corroborating the findings of a previous study. Juvenile *P. glutinosus* notably lacked biofluorescence in the postcloacal glands that appear in mature males and (some) female *P. glutinosus*. Therefore, biofluorescence may be diagnostic of sexual maturity of these species. Species reliant on other senses, like *Cryptobranchus alleganiensis*, were less florescent when compared to more visually oriented species. Biofluorescence may be used in conspecific and heterospecific communication in behaviors like reproduction, yet further study is necessary to determine the ecological significance of this trait.

49. Pronghorn (*Antilocapra americana*) Migration Adaptations

Zoe Gaetjens*+
Gannon University

Since the 19th century and the progression of industry, migration patterns of animals across the United States have been hindered. The growth of industries have caused human-made structures to interfere with migration of many species of animals. In Yellowstone National Park, the pronghorn species had lost their migration path from the top of Yellowstone Park down through Wyoming due to roads, railways, and structures. Research on the effects of inhibited migration patterns of pronghorn in Yellowstone National Park consisted of using digital media to collect information on the structures in Yellowstone and the solutions that allow pronghorn to migrate the full route. Research on the physical evolutionary adaptations of pronghorn was also done to show that pronghorn are meant to make long migratory trips safely. The results of various solutions to resolve pronghorn migration blockages show that the pronghorn species is stable and no longer fading away.

50. The Fishes of Select Presque Isle Ponds

Connor Haskins*+, David Argent, William Kimmel, Robert Whyte, Lauren Abbott
PennWest University-California, Department of Biology, Earth, and Environmental Science

Presque Isle is a dynamic system, with shifting beaches which has created a series of sand pits along is eastern-most edge. We sampled four of these pits located between Gull Point and Beach 10, between 24-25 June 2024. We employed backpack-electrofishing gear and Wisconsin-style-mini-fyke nets. Approximately 30 minutes was expended in each pond with electrofishing gear while fyke-nets were left to fish overnight. We collected 45 fishes with electrofishing gear and 350 fishes with fyke nets. The Central Mudminnow (*Umbra limi*) was the dominant fish collected with electrofishing gear (22% of catch), while Common Shiner (*Notemigonus crysoleucas*) was dominant with fyke net (84% of catch). Each pond contained relatively unique communities of fishes. Of note was the capture of Warmouth (*Lepomis gulosis*), a state endangered fish. Continued sampling could reveal other fishes present in these ponds.

51. The Submergent Vegetation of the Gull Point Ponds, Presque Isle State Park

Emma Burkett[1], Joshua Ernst[1]*, Robert Whyte[2]
[1]*PennWest University-Edinboro, Department of Biology, Earth, and Environmental Science*
[2]*PennWest-University-California, Department of Biology, Earth, and Environmental Science*

The establishment of ponds on Gull Point are a recent establishment. Few studies have explored the ecology of these environments. Presque Isle aquatic habitats contain a diverse community of submergent macrophytes but the establishment of invasive species such as Eurasian watermilfoil and others threaten their continued viability. As part of a larger assessment of the wetland plant community of Presque Isle State Park we surveyed the submergent macrophytes in seven ponds on Gull Point. These ponds were typically 1 acre or smaller in area. Several ponds were inaccessible and not monitored because of established nesting bird populations. Random stratified sampling was carried out in each pond and using a "rake method" we sampled for submergents in each plot recording plant species presence, abundance, and water depth. Plants were collected and sorted by species and biomass (dry weight) determined for each species in each pond. Water samples were collected every other week (June-August). Several species of invasive submergent macrophytes were found in the sampled ponds but there was a noticeable lack of broad-leaf pondweeds (*Potamogeton*). We continue to assess and analyze the data but there appears to be species differences across the ponds and an associated difference in water quality.

52. Biological Surveys in Restored Primary Wetland Habitats on Presque Isle State Park Erie, PA

Sarah Magyan*, Sean Dalton
Regional Science Consortium

Invasive plant species can have numerous negative effects if left unopposed in priority wetland habitats for many biological species, ultimately leading to their displacement. The RSC monitors species of native amphibians, fish, mussels, and macroinvertebrates using various methods at 7 priority wetland habitat restoration areas distributed across Presque Isle State Park in Erie County, PA where treatment for invasive plants has been applied since 2009. Surveys were conducted both before and after native replanting efforts by Go Native! Erie. These surveys seek to catalog the change in native biodiversity in these restored habitats.

53. Aerial Drone Surveys of Shoreline Change and Primary Wetland Habitats on Presque Isle State Park, Erie, PA

Sean Dalton*
Regional Science Consortium

Presque Isle's shoreline and wetlands are dynamic environments subject to rapid change as a result of underlying geologic and biological conditions. These changes have direct impacts on the local economy and ecosystems of Erie, PA and Presque Isle State Park. In response, the RSC has integrated drone surveys into two of its already existing monitoring projects including tracking erosional changes to Presque Isle's lakeside shoreline over time and indexing the health of primary wetland habitat vegetation.

54. Biological and Chemical Transformation of Soil by Goats used for Sustainable Eradication of Invasive Species at the Glinodo in Erie, PA

Emma Stitzenberg*+, Molly Tarvin*, Rajinikanth Mohan
Mercyhurst University, Erie, PA 16456

Invasive species such as multiflora rose and blackberry can smother native plants and cause ecological imbalance and this has been a problem at the Glinodo in Erie, PA. Instead of harsh chemical treatment typically used, the sisters at Glinodo recently employed goats to remove invasive species. This led us to wonder how the introduction of the goats could impact soil chemistry and biology through urination and defecation. To understand this, we collected soil and goat fecal samples from Glinodo and analyzed them. Supplementation of soil with goat manure collected from Glinodo dramatically promoted the germination and growth of corn, but strikingly inhibited pea plants, indicating that goat manure can promote the growth of certain plants while inhibiting others. To understand if the presence of goats changed soil chemistry, we tested and found that total nitrogen and carbon within the soil was 2-3 times higher in the soils inhabited by the goats and it is possible that this nutritional change could affect plant growth. Bacteria in goat manure could also influence plant growth and to test this, we isolated eight distinct bacteria from goat fecal matter, the most abundant being *E. coli,* and we will test the impact of these bacteria. The results of this study could shed light on how sustainable it would be to invest in goats and other animals to reclaim land from invasive species.

55. Goats Don't Work: Prescribed Browsing by Goats Fails to Control Multiflora Rose in a Temperate Deciduous at the Erie National Wildlife Refuge in Northwestern PA

Alexander J. Clifford,[1] Mitchell A. Curtis,[1] Grant Dowden,[1] Alejandra I. Fernandez,[1] Declan T. Graham[1], Katherine R. Hoehl,[1] Joshua R. Huang,[1] W. Tommy Johnson[1]*+, Mary M. Karstens,[1] Kate R. Leach,[1] Zane L. Molgaard,[1] Jessica B. Morgan,[1] Laura N. Obergefell,[1] Audrey K. Ritley,[1] Lorenzo K. Tovanche,[1] Alexis, Vanderhoof,[1] Yianni Laskaris,[2] Richard D. Bowden[1, 3]
[1]Allegheny College, Department of Environmental Science and Sustainability, 520 N. Main St., Meadville, PA, 16335, [2]Erie National Wildlife Refuge, 11296 Woodduck Ln, Guys Mills, PA 16327, [3]Corresponding Author

Multiflora rose (*Rosa multiflora* (MFR)) often dominates the understory in temperate forest locations, reducing native plant biodiversity. Conventional controls (herbicides, uprooting, burning, chronic stem-

removal) are expensive, time-consuming, reduce non-target plants, and threaten aquatic ecosystems. In a deciduous forest at the Erie National Wildlife Refuge, the US Fish and Wildlife Service introduced prescribed goat-browsing for five consecutive summers to control MFR in a temperate deciduous forest. Treatments included browsing, browsing and herbicides (BH), and controls. We evaluated effects on MFR and non-MFR herbaceous vegetation one year after the last summer of browsing. There were more stems in the browsed treatment (18 m^{-2}) than the control (13 m^{-2}), stem length in browsed and control treatment did not differ. Stem count (6 m^{-2}) and stem length (32 cm) were lower in the BH than the control. Stem mass did not differ between browsed and control sites. Leaf mass and the leaf/stem ratio was greater in the browsed treatment than the control, suggesting that MFR is responding to the lack of herbivory by increasing photosynthetic capacity. Non-MFR plant density did not differ by treatment, suggesting that treatments did not alter non-target plant diversity. An unintended consequence was that goats browsed on the bark of trees; 35% of trees were browsed with 45% of the circumference damaged. Browsing resulted in mortality to 14% of trees, and major branch loss to an additional 9%.In the long-term, using goats in conjunction with herbicides reduces MFR, but goats alone will not reduce this invasive plant.

56. Evidence of Growth Decline in a Black Cherry-Sugar Maple Forest

Leah Frase[1]*+, Jackie DiGiacomo, Nathalie Paz Saucedo, Aiden Beinhauer, Richard D. Bowden[2]
Allegheny College, Department of Environmental Science and Sustainability, 520 N. Main St., Meadville, PA, 16335

For three decades, the Detritus Input and Removal Treatments Experiment at the Allegheny College Bousson Experimental Forest has been examining controls on soil carbon (C). As part of that effort we routinely measure tree biomass and leaf production in this temperate deciduous forest. Tree biomass increased linearly across the site; if biomass was increasing at a constant percentage, then exponential growth would occur. Cherry dominates the site, however maple is becoming less dominant. Given maple's tolerance of shade, the proportion of maple was expected to have been increased. Mortality of maple has declined, but cherry has increased. Cherry is a short-lived species, thus increased mortality is expected. Site-level biomass increases of living trees have slowed dramatically in cherry and maple. Beech growth remains constant, and oak, though a small component of the forest, is increasing its growth. New saplings are added to the population, however their mortality rates are high, now likely accelerated by beech leaf disease, and their addition to the total tree population adds little to total site biomass. Increased mortality of cherry and declines in growth rates of beech and maple led to decreased net annual biomass growth. Litterfall varied among years ($p<0.001$), but did not decline as expected with declines in tree growth. Reduced tree growth rates while litter production remained constant was unexpected. Decreased tree growth might be caused be increased regional temperatures that increase cellular respiration, leading to less C allocated to biomass growth. Decreased forest productivity will lead to decreased soil carbon storage.

57. Mortality and Ecological Succession of an Ash-Dominated Forest Impacted by the Emerald Ash Borer: An Eight-Year Study

Katherine Curtiss*+, Dr. Christopher Dolanc
Mercyhurst University

The emerald ash borer (*Agrilus planipennis*) is an invasive species of beetle that has caused widespread damage and mortality to ash (*Fraxinus*) trees throughout the United States and Canada. Native to Asia, the beetle has no real predator in North America, nor has the ash species developed any resistance to their attacks like the trees found in their native range. This allows the beetles to invade an area with a swift and severe outcome. The adults eat the canopy of the tree while the larvae are located within the inner bark, eating away the vascular cambium. This continues until finally the tree can no longer photosynthesize or transport enough nutrients to stay alive. In this study, we looked at two impacted stands of an ash-dominated forest located in Asbury Woods, Erie PA in order to gather more information on ash regeneration and the ecological succession of the forest. The first data was collected in 2016 before the

invasion occurred, and every year since. The results show a rise in mortality in mature ash trees after the beetles were detected. The data also indicates a rise in density to the understory due to the changes in canopy cover. No evident increase or decrease in species diversity was noted within the study, though due to the site still undergoing changes this could differ in the future.

58. A checklist of gall-forming arthropods of Presque Isle State Park, with notes on preserving specimens for museums

Tyler Brooks*
Natural History Museum at the Tom Ridge Environmental Center (TREC)

Galls are abnormal growths caused by chemical changes and induced by several arthropod groups. Unlike leafminers, leaffolders, or other forms of arthropod-induced damage, galls must induce a chemical change in the host plant, and can be present on the leaf, roots, or stem of the plant. Galls can also include non-arthropods. A checklist of gall-forming arthropods on Presque Isle State Park is presented, compiling historical occurrences as well as recent observations. Sampling for gall-inducers occurred between June-October of 2024. Galls recorded between this time were photographed in the field and galls that could be reared were collected. 51 species of gall-forming arthropod are recorded, comprised of 4 lepidopterans, 13 hymenopterans, 14 dipterans, 6 hemipterans, and 14 eriophyid mites. Galls were recorded on 20 different genera of plant, with *Quercus* and *Solidago* being the most common hosts. Rearing attempts were documented for six species. Notes on the rearing techniques are compared to historical and present records, reflecting a lack of current peer-reviewed publications on both rearing and preservation of galls are provided.

ABSTRACTS

Regional Science Consortium
20th Annual Research Symposium
November 6-8, 2024
Tom Ridge Environmental Center
at Presque Isle State Park

ART EXHIBITION

ART EXHIBITION: Wednesday, November 6, 2024, 6pm—8pm

Pattern and Print on Plant Paper

Ashley Pastore*
Grounded Printshop

Media: Paper
Dimensions: Variable
Description: Handmade paper made from invasive Mugwort and Japanese Knotweed, pigment extracted from various plants.

Scenes from a year of fieldwork at a western New York lake

Rebecca G. Topness*
Department of Geology, University at Buffalo

Media: Watercolor and colored pencil
Dimensions: Series of four paintings, each 9x12”
Description: Art exhibit – four watercolor paintings depicting geologists collecting samples from a lake through different seasons. Climate models predict the Great Lakes region will undergo rapid climate changes this century. For example, drier summers could significantly impact freshwater resources, while wetter winters will likely intensify urban flooding. Records of past climate are valuable for constraining how the water cycle changed during times in Earth’s history when climate warmed as rapidly as today. Lakes are key archives of past climate because they preserve proxies for temperature and precipitation in their sediments. However, these proxies often reflect multiple climate processes, many of them specific to the lake environment. Lake proxy system models, which simulate how a climate signal is encoded in a proxy, allow us to translate these values into climate variables that are accessible to the public and useful for comparison with Global Climate Models. Like any model, lake proxy system models need to be calibrated using observations. As part of my PhD research at the University at Buffalo, I lead teams of students to collect monthly observations from lakes in western New York. This watercolor series depicts scenes from our fieldwork over the course of a year. In the paintings, geologists collect water samples for stable oxygen and hydrogen isotope analysis and use a sonde and data loggers to measure variables such as temperature and lake level. I aim to share the experience of fieldwork with a broader audience through art. The paintings not only offer a glimpse into the scientific process but also celebrate the beauty of the lake's seasonal transformations.

Abstract Rose

Patricia Mazurkiewicz*

Media. Acrylic marker and primer on canvas
Size: 16 x 20 x .25”
Description: A formulated effects of markers and primer colors added with mixed media

Space man signs on MDF and hooks

Patricia Mazurkiewicz*

Media: mixed and sealed

Dimensions: 20 x 30 MDF

Description: an artist interpretation of time and space

Harmony

Patricia Mazurkiewicz*

Media: Acrylics fluorescent

Dimensions: 18 x 24 unframed loop hook

Description: A metaphorical way to form peaceful transition. The survival of black and white Starry night Van Gogh approach at background expressing peace

Moonshatza 1 and 2 the celestial being

Patricia Mazurkiewicz*

Media: Acrylic on canvas

Dimensions: Two paintings, each 16 x 20

Description: Balance between dark and light matter.

Plankton Sample No. 375

Debbie Penley*

Media: Made with wool and stretched over a wooden frame. Wet and needle felted.

Dimensions: 18"x18"

Description: I am a multimedia artist with a recent concentration in fiber art. My work ranges from the realistic and lifelike to theabstract and whimsical. I enjoy the tactile qualities of my work, and am often amazed at the almost magical transformationof the raw materials from a fluid state into something more enduring and solid. I find that ideas often grab hold of me anddon't let go until they appear, fully materialized, in the medium of my choice. My hope is to connect with the viewer in away that transports them to the world as seen through my eyes.

Anatomical art: a series of cadaver images

Morgan E. Schmitt*, Dr. Prasad Dalvi, Dr. Elisa M. Konieczko

Media: graphite pencil on mixed media paper

Dimensions:

Description: Throughout the spring 2024 semester at Gannon University, I created three illustrations of an elderly female cadaver. Dr. Dalvi provided permission to observe the cadaver and draw the images during BIOL 366, Human Gross Anatomy laboratory. Dr. Konieczko provided guidance into planning of scientific illustration and what level of detail to include in each image. The three images that will be exhibited are of various levels of dissection into the cranial cavity: intact surface level, intermediate, and deep cranial cavity. The medium used to create these images was graphite pencil on mixed media paper. At the end of the spring 2024 semester, all three images debuted in the Gannon University Schuster Gallery, and the intermediate dissection picture was sold to a private collection. The party that bought the piece has agreed to lend it to the consortium for this conference.

Astronomy Collages

Jacob Salis*

Media: Magazine collages

Dimensions:

1: 7”x41/4”

2,3,4: 8 1/2x7”

5,6,7: 14x11”

8: 17x14”

Description: Creating astronomy magazine collages has become a personal journey for me, blending science with art in a way that brings the universe closer. As I cut out and layer images of galaxies, nebulae, and distant stars, I feel a deep connection to the cosmos. The process transforms these distant, unreachable places into something tangible, something I can shape with my hands. Each collage tells a story of wonder, awe, and curiosity, capturing both the vastness of space and my own reflections on our place within it. These collages allow me to explore the beauty and mystery of the universe in a more personal way, turning the cold data of astronomy into something that evokes warmth, introspection, and connection. Through this artwork, I invite others to share in this journey. To see the universe not just as distant objects, but as part of something we all can connect to.

Chlorophyll Print

Cole Webster*

Media: leaf chlorophyll print

Dimensions: 7 inches by 14 inches

Description: While living in Baltimore and studying at the Maryland Institute College of Art, my work focused on collections of natural and found objects. In the course of my study, I incidentally found several specimens of birds on the city sidewalks, apparently injured by striking the windows of the city’s buildings. I incorporated these specimens and the issue of bird window-strikes into my work at MICA. My first project was a small oil painting of a found Wood Thrush specimen (*Hylocichla mustelina).* Recently, while researching sustainable photographic processes, I discovered the 19th century process of chlorophyll printing. In this process, an image is created by exposing the chlorophyll in green leaves to direct sunlight. The sunlight essentially breaks down the chlorophyll molecules and bleaches the plant leaf. The image is created by covering parts of the leaf and leaving other areas exposed to the sunlight. Experimenting with this process, I have collected many different species of leaves and found the large leaves of the Pawpaw (Asimina Triloba) tree to be ideal for chlorophyll printing. The image printed with this process is a digitized print of my Wood Thrush painting from MICA. Initially, I created a digital positive of the painting on transparency paper. The positive was secured to the Pawpaw leaf and exposed to a cumulative 24-hours of direct sunlight to create the image. The light sensitive print was fixed with a copper sulfate solution. In this fixing process, copper replaces the magnesium in the leaf which absorbs light and causes fading. To further stabilize this print, the leaf specimen is pressed between glass and secured with fabricated metal fasteners.

Biofluorescence in the Northern Slimy Salamander

Holden Cooper*

Media: Framed photo

Dimensions: 16" x 16"

Description: Slimy Salamander (*Plethodon glutinosus*) biofluorescence in response to cyan excitation light. To observe this a cyan light was shined on a slimy salamander, with a longpass filter placed in front of the camera lens. This blocks out cyan light, so we only see the light re-emitted from the salamanders' skin, allowing us to see the biofluorescent patterns of the salamander.

Holy Moments: 8/04/23 Sky in Mantua, OH, 2024

Em Crisman*

Media: Watercolor and Cyanotype on Paper, Wood Frame

Dimensions: 30”x20”

Description: Divine encounters in nature are Holy Moments. There are times in our lives where the lines of this world and the spiritual realm disappear, and we find ourselves expectantly or unexpectedly in the presence of God. This body of work translates the experience and sights during a divine encounter into a painting. I always make my cyanotypes outdoors in the sun, as being in nature brings me joy. After the cyanotypes develop on paper, I tone them with various organic tinctures, creating an underpainting that offers a stunning range of colors that watercolor alone can't achieve. I then intuitively layer delicate, transparent washes of watercolor to finish the piece.

Holy Moments: 1/14/21 Sky at Presque Isle, 2024

Em Crisman*

Media: Watercolor and Cyanotype on Paper, Wood Frame

Dimensions: 30”x20”

Description: Divine encounters in nature are Holy Moments. There are times in our lives where the lines of this world and the spiritual realm disappear, and we find ourselves expectantly or unexpectedly in the presence of God. This body of work translates the experience and sights during a divine encounter into a painting. I always make my cyanotypes outdoors in the sun, as being in nature brings me joy. After the cyanotypes develop on paper, I tone them with various organic tinctures, creating an underpainting that offers a stunning range of colors that watercolor alone can't achieve. I then intuitively layer delicate, transparent washes of watercolor to finish the piece.

Holy Moments: 10/24/15 Hot Air Balloon Ride in Sacramento, CA, 2024

Em Crisman*

Media: Watercolor and
Cyanotype on Paper, Wood Frame

Dimensions: 20”x 30”

Description: Divine encounters in nature are Holy Moments. There are times in our lives where the lines of this world and the spiritual realm disappear, and we find ourselves expectantly or unexpectedly in the presence of God. This body of work translates the experience and sights during a divine encounter into a painting. I always make my cyanotypes outdoors in the sun, as
being in nature brings me joy. After the cyanotypes develop on paper, I tone them with various organic tinctures, creating an underpainting that offers a stunning range of colors that watercolor alone can't achieve. I then intuitively layer delicate, transparent washes of watercolor to finish the piece.

Weed Tangle

a) **Beetle**
b) **Clover**
c) **Hawksbeard**
d) **Milkweed**
e) **Posion Ivy**
f) **Sweet Pea**
g) **Virginia Creeper**
h) **Yucca**

Abbey Paccia*

Media: Ball-point pen on drawing paper

Dimensions: 8 drawings, each 6 in x 4 in (9 in x 7 in framed)

Description: This series of drawings is the result of hours of close observation given to plants our culture usually deems unworthy of artistic portrayal. They honor small and neglected patches of plant life within

spaces often thought of as human territory. We trim and cut back unwanted growth throughout the warmer seasons, only for the resilience of plant life to show itself time after time. The plants shown here are providers of pollen, poison, nourishment, and facilitators of importance chemical processes. Some are invasive, others native to our region. Some were once prized and cultivated but are now left to grow as they will without notice or care. All of the tangles depicted here thrive of their own accord, without aid or interference from human hands.

Art Lifts Science in the Badlands

Ashleigh Frost*, Patrick Burkhart*
Badlands Working Group, Department of Chemistry and Environmental Geoscience, Slippery Rock University of PA

Media: digital drawings, paintings, etchings, acrylic and watercolor paintings, and photos of landforms and landscapes across the White River Badlands
Dimensions: Multiple pieces of varying sizes
Description: The Badlands Working Group is a collaboration of faculty from multiple universities mentoring undergraduate collaborators in the study of landscape evolution across the White River Badlands in the American Great Plains. Over the past quarter-century of endeavor, we have placed significant emphasis upon making Art an integral partner with Science to convey the stories of the land. This year, Ashleigh's digital contribution is a caricature of landforms that are key to our investigations. Our research has captured significant insight into the changes that have affected slopes and dunes since the last Ice Age. In addition to Ashleigh's digital 'painting', this installation will include photography, watercolor on paper, acrylic on canvas, pencil sketches, and linocut pieces. Noted contributors include Katerine Mickle, MFA, Professor of Art, as well as SRU Art alumni: Ben Bires and Dawn Wolfe. Enjoy!

Summer Sunset

Durim Loshaj*

Media: Oil on Gessoboard
Dimensions: 16 in x 16 in
Description: All of my art is inspired by the natural world we see all around us. This painting is the latest piece that follows that principle. I've studied a variety of dogwood trees and berries for years now due to their unique features. I chose these plants based on their shapes and how they look when they're placed next to each other. Color is one of the most important elements of a painting so I chose blue and purple hues to complement the orange and yellow gradient. In this painting I assembled a composition that balances shapes and colors in a harmonious way. I then used geometry to emphasize the recurring patterns that repeat in nature. These geometric patterns are a metaphor for natures interconnectedness.

Cormorant Ecliptic, Version II (2024)

Andrew Sontheimer & Brittany Stowe*

Media: Encaustic cyanotype on canvas
Dimensions: 16 x 22 inches
Description: This collaborative work *Cormorant Ecliptic, Version II* (2024) blends the documentation of native plants and foraged pollinators with scientific illustration by way of the traditional cyanotype process. This historic, non-silver photographic process was used to reproduce the original version - a limited edition relief print entitled, *Cormorant Ecliptic (2024).* This sustainable alternative to other photographic processes consists of two iron-based solutions (A - Potassium Ferricyanide / B - Ferric Ammonium CItrate) mixed at an equal ratio to create a UV-sensitive emulsion. After the raw canvas was washed, prepared and coated, the final image you see here was sun-printed using found botanicals and feathers. The illustration by Andrew Sontheimer commemorates a rare ecliptic moment observed through the lens of wildlife that can be found at Presque Isle State Park.

Lake Science for Idiots

Michael Berlin*

Executive Producer of the Regional Emmy award winning 'Chronicles', WQLN/PBS/NPR

Media: Video

Description: Along the shores of Lake Erie there is a bevy of activity that most of the public is completely unaware of - whether it's the changing ecological conditions of the lake, the history of the economy of the docks, or the research that is done on a daily basis. So, what happens when you have a television show featuring the Lake and none of your team share the accreditation of the individuals you are looking to interview? This was the case for the WQLN/PBS/NPR show 'Chronicles'. The objective of 'Chronicles' is - and always was - to preserve the history of the region and educate a diverse audience while simultaneously putting that history into context. To meet that goal, the production team required a crash course in the science of the lake while working against the very real pressures of a broadcast deadline. By building connections with local and regional organizations and experts, 'Chronicles' successfully provided a platform to share the ecological and economic history of the lake to the community. The fresh perspectives offered here will hopefully lead to increase advocacy and interest into everything happening in lake science.

You Call Me Lake Erie

Collaboration by Melissa A. Troutman* and The Sound Serum

Media: Audiovisual

Description: As a journalist, advocate, and teacher, Melissa A.Troutman understands the power of a question asked simply, at just the right moment. Right now is one of those moments. As humanity, society, and the planet face the consequences of a terrible fever, one of the symptoms of a grave yet curable illness, she asks: *How has our relationship to Nature and each other led to this?* Melissa believes that it's our relationships that ultimately determine the quality of our health, our wealth, and our happiness. The poem "You Call Me Lake Erie" that Melissa narrates in this piece came to her while soaking in a bath, which summoned thoughts of the hidden pathways water takes from Lake Erie to her home. In this piece, Melissa traces our human connections to Lake Erie back through time and invites us to examine "*what kind"* of relationship we have with the lake. This piece is an adaptation of the Emmy-nominated series *Lake Erie, Our Kin*, which Melissa wrote and co-directed with Erie-based filmmaker John C. Lyons. Original footage was edited by Jesse James, another Erie-based filmmaker. The dancers featured are Erie's own Jennifer Dennehy, Emmaline Devore, Maya Richards, Jenna Swartz, and Andona Zacks-Jordan. Scenes also include Sister Pat Lupo and students of the Neighborhood Art House, local watercolor artists, Seneca Nation drummers, and tenants of the Haudenosaunee Great Law of Peace. The *Lake Erie, Our Kin* series originally aired on WQLN PBS in April 2023. To connect email ms.troutman@gmail.com or follow @thetroutwoman on Instagram. **The Sound Serum** is the instrumental moniker for Erie-based composer and artist Anthony Carson. "Tonal Tonic 003" is the first release of musical works intended to give the listener an aural space to connect with themselves through the subjective interplay of sound and mind. In the short film "You Call Me Lake Erie," Tonal Tonic 003 creates a fluctuating emotional undercurrent to illustrate the beauty of the images of Lake Erie, its people, the impact of industry, and the relationship between each, and to remind the viewer of their place within the living body of the lake and all beings who depend on the health of their shared ecosystem.