79TH ANNUAL

Eastern Colleges Science Conference

MARCH 29, 2025

Welcome to the 2025 Eastern Colleges Science Conference

On behalf of Wilkes University, it is our pleasure to welcome you to the 2025 Eastern Colleges Science Conference. We are honored to host ECSC for the sixth time in its proud history, continuing a tradition of showcasing outstanding undergraduate research and fostering scientific exchange among students and faculty across the region.

This year's program features an exciting range of poster sessions and platform presentations, representing disciplines across the sciences—including biology, chemistry, environmental studies, psychology, neuroscience, and computer science—with some exciting interdisciplinary work in materials science, biomedicine, and data analysis. We are especially pleased to welcome Dr. Kim D. Allen as our keynote speaker, whose work at the forefront of molecular neuroscience will undoubtedly inspire our community of scholars.

In addition to traditional research presentations, we invite you to take part in this year's Talking Circles—an informal addition to the ECSC format. These circles are designed to create space for candid dialogue and community building. Our **Student Talking Circle**, focusing on graduate school and job applications, and our **Faculty Talking Circle**, which explores the growing role of AI in research, reflect ECSC's commitment to relevant and evolving conversations in science education and professional development.

Whether this is your first time attending or you're a long-standing member of the ECSC community, we hope you'll find this year's conference both intellectually stimulating and personally meaningful.

Welcome to Wilkes-Barre, and welcome to ECSC 2025.

Warm regards,

Tony Kapolka and HyeRyeon Lee
Chairs, 2025 ECSC Planning Committee
Wilkes University

A special thanks goes out to the following Wilkes Students
who worked to make this conference a success:

Brenda Arias
Owen Barnes
Justin Blake
Yeremin Castillo Santana
Cody Dembski
Kevin Doran
Alexander Garcia Reyes
Jaryn Hartranft
Ivan Jean-Charles
Dominic Lopez
Jeylin Loveras Hernande
Donell MacKey-Woodson
Matthew Meagher
Justin Moore
Jenny Nguyen
Belen Peralta
Diem Pham
Herbert Ramirez
Chris Rodriguez
Li Shi
Nick Splain
Brynn Ullerich

Schedule of Events

9:00-9:30 Registration / Breakfast
SLC, First Floor

9:30-10:30 Welcome / Keynote Address
SLC 101

10:30-12:00 Poster Session A
SLC Engineering Hallway

11:15-12:30 Platform Presentations B
SLC 130

11:45-12:45 Student Talking Circle: Anecdotes about Grad School/Employment Applications
SLC 136

12:00-1:30 Lunch
Henry Student Center, 3rd Floor

12:30-1:30 Board Meeting
Henry Student Center, 2nd Floor, Miller Room

1:30-3:00 Poster Session C
SLC Engineering Hallway

2:30-3:15 Platform Presentations D
SLC 130

3:00-4:30 Poster Session E
SLC Engineering Hallway

3:30-4:30 Faculty Talking Circle: Using AI in Research
SLC 136; Led by Dr. Del Lucent, Wilkes University.

6:00 Award Banquet
Mohegan Pennsylvania Convention Center, 1280 PA-315, Wilkes-Barre, PA 18702

Judging Room (10:30-5:00) SLC 137

Internet Access

The *guest.wilkes.edu* password is: *AtWilkesYouWill*
Please make note of the capitalized letters.

Campus Map

Parking is in lot 5

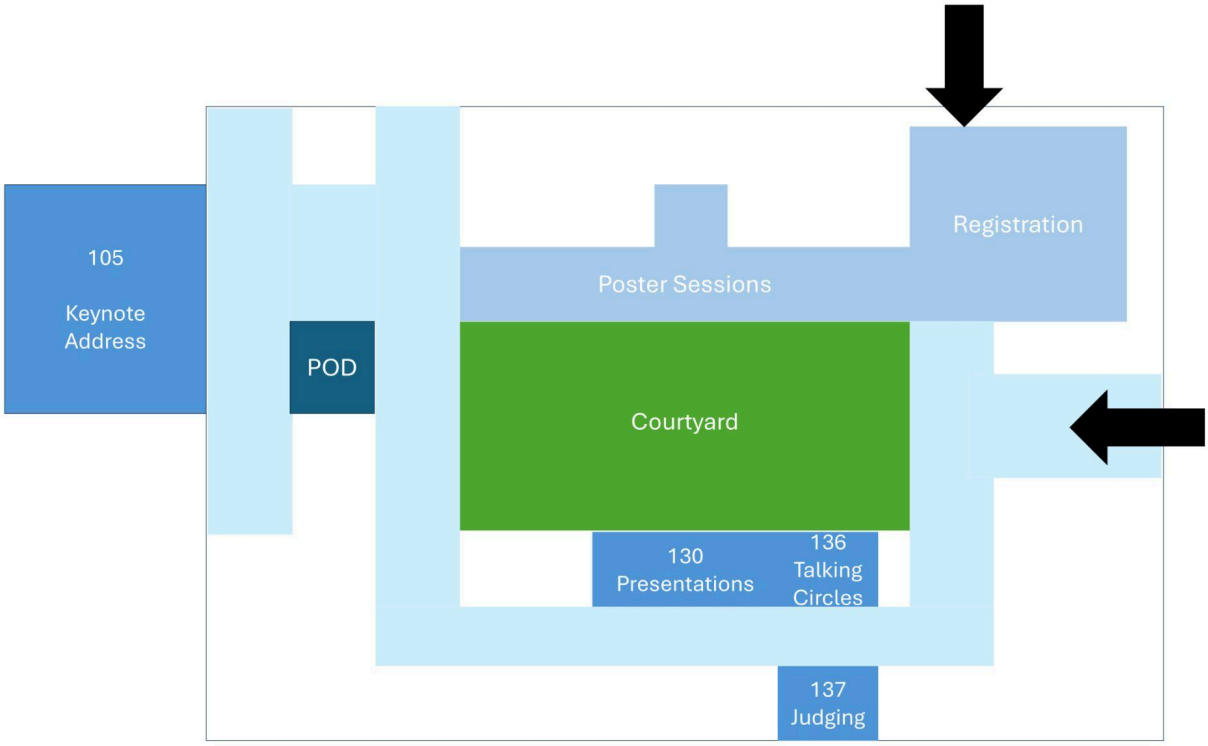
Registration and all sessions are in Stark Learning Center, building 39

Lunch and the ECSC Board Meeting are in the Henry Student Center, building 46

Stark Learning Center Map

All conference activities except lunch take place on the first floor of SLC.

The hallway extends completely around the first floor so if you get lost - keep walking!



Eastern Colleges Science Conference Meetings

1947: Vassar College, Poughkeepsie, NY
1948: Union College, Schenectady, NY
1949: Adelphi College, Garden City, NY
1950: Barnard College, New York, NY
1951: Yale University, New Haven, CT
1952: PA College for Women, Pittsburgh, PA
1953: N.Y. State Col. for Teachers, Albany,NY
1954: Brooklyn College, Brooklyn, NY
1955: Seton Hall Univ., South Orange, NJ
1956: Temple University, Philadelphia, PA
1957: Georgetown Univ., Washington, DC
1958: Wilkes College, Wilkes-Barre, PA
1959: Suffolk University, Boston, MA
1960: Hunter College, New York, NY
1961: SUNY College of Forestry, Syracuse, NY
1962: NC State College, Raleigh, NC
1963: Boston College, Chestnut Hill, MA
1964: Jersey City State College, Jersey City, NJ
1965: Danbury State College, Danbury, CT
1966: D.C. Teacher's College, Washington, DC
1967: Fordham University, New York, NY
1968: Yale University, New Haven, CT
1969: Yale University, New Haven, CT
1970: Wilkes College, Wilkes-Barre, PA
1971: Rosary Hill College, Buffalo, NY
1972: U.S. Military Academy, West Point, NY
1973: Pennsylvania State Univ., Univ. Park, PA
1974: Worcester Polytech. Inst., Worcester, MA
1975: Widener College, Chester, PA
1976: Rhode Island College, Providence, RI
1977: Fairleigh Dickinson Univ., Rutherford, NJ
1978: Union College, Schenectady, NY
1979: Wilson College, Chambersburg, PA
1980: SUNY at Cortland, Cortland, NY
1981: Jersey City State College, Jersey City, NJ
1982: Lycoming College, Williamsport, PA
1983: Wilkes College, Wilkes-Barre, PA
1984: Providence College, Providence, RI
1985: SUNY and Fredonia, Fredonia, NY
1986: DuquesneUniversity, Pittsburgh, PA
1987: Lycoming College, Williamsport, PA
1988: Ithaca College, Ithaca, NY
1989: U.S. Military Acad., West Point, NY
1990: Manhattan College, New York, NY
1991: SUNY at Fredonia, Fredonia, NY
1992: U.S. Naval Academy, Annapolis, MD
1993: Central CT State Univ., New Britain, CT
1994: Duquesne University, Pittsburgh, PA
1995: Ithaca College, Ithaca, NY
1996: Lycoming College, Williamsport, PA
1997: Central CT State Univ., New Britain, CT
1998: Niagara University, Lewiston, NY
1999: Sacred Heart University, Fairfield, CT
2000: Wagner College, Staten Island, NY
2001: Wilkes University, Wilkes-Barre, PA
2002: Niagara University, Lewiston, NY
2003: Ithaca College, Ithaca, NY
2004: Manhattan College, Bronx, NY
2005: Central CT State Univ., New Britain, CT
2006: St.Joseph'sUniversity, Philadelphia, PA
2007: College of Mount St. Vincent, Bronx, NY
2008: Niagara University, Lewiston, NY
2009: Wagner College, Staten Island, NY
2010: Pace University, Pleasantville, NY
2011: Sacred Heart University, Fairfield, CT
2012: William Paterson University, Wayne, NY
2013: Providence College, Providence, RI
2014: Marist College, Poughkeepsie, NY
2015: Niagara University, Lewiston, NY
2016: Western NE Univ., Springfield, MA
2017: Wilkes University, Wilkes-Barre, PA
2018: Ithaca College, Ithaca, NY
2019: Manhattan College, Bronx, NY
2020: Cancelled due to COVID-19
2021: Virtual Conference
2022: Iona College, New Rochelle, NY
2023: Sacred Heart University, Fairfield, CT
2024: Niagara University, Lewiston, NY
2025: Wilkes University, Wilkes-Barre, PA

Kim D. Allen, PhD
Biology Educator, Mentor
Molecular Neuroscientist

***New Ribosomes for New Memories?* Learning-induced rRNA variants required for Memory Formation: A New Frontier.**

Nothing plays as great a role in defining who we are as individuals, as the memories we form —not even our unique combination of genes. How it is that lived experiences get physically encoded into lasting mental representations is a leading question in neuroscience—in particular, given the temporal nature of the biological substrates of which memories are comprised, how are they maintained in a state that is pliable yet intact sometimes for the lifetime of the organism? In this talk, I will provide a brief primer of the field of molecular cellular cognition and share the story of two groundbreaking discoveries: 1) Long-term synaptic potentiation requires new PARP-1-dependent ribosome biogenesis, and 2) specific learning-induced ribosomal RNA variants are required for memory consolidation (Allen et al., 2014, 2018).

This provides the first evidence of epigenetically regulated, differentially expressed non-coding ribosomal RNA in memory consolidation.

Professional Preparation:

- **Postdoctoral Research,** Molecular Neuroscience, SUNY Downstate Medical Center, Brooklyn, NY. (2014)
- **Postdoctoral Fellowship,** Neurobiology and Behavior, Columbia University, New York, NY. (2008)
- **Ph.D., Molecular Biology**, Georgia Institute of Technology, Atlanta, GA. (2003)
- **B.S. Biology**, Mount St. Mary's University, Los Angeles, CA, (1988)

Appointments:

- Research Assistant Professor, **(**2014 – Present)
  Neuroscience Division, Pathology Dept., SUNY Downstate Health Sciences University, Brooklyn, NY.
- Adjunct Assistant Professor of Biology, (2009 – Present)
  City University of New York, Medgar Evers College, Brooklyn, NY

Recent Grant Award:

PSC-CUNY Adjunct Professional Development Grant to study changes in neuronal gene expression of key cognitive proteins during the progression of Alzheimer's Disease in APP/PSI transgenic mouse model.

Selected Publications:

Hou, J. Y., **Allen, K. D**., Hernandez, A. I., Cottrell, J. E., & Kass, I. S. (2025). Sevoflurane Preconditioning Rescues PKMζ Gene Expression from Broad Hypoxia-Induced mRNA Downregulation Correlating with Improved Neuronal Recovery. NeuroSci, 6(1), 9. https://doi.org/10.3390/neurosci6010009

K.D. Allen, M.J. Regier, C. Hsieh, P. Tsokas, M. Barnard, S. Phatarpekar, J. Wolk, A.A. Fenton, T.C. Sacktor, A.I. Hernández (2018). *Learning-induced Ribosomal RNA is required for memory consolidation in mice—Evidence of differentially expressed rRNA variants in Learning and Memory.* PLoS ONE 13(10): e0203374.

A Iván Hernández, Juan M Alarcon, **Kim D Allen** (2015). *New ribosomes for new memories?* Commun Integr Biol. Apr 15;8(2): e1017163. doi: 10.1080/19420889.2015.1017163.

Kim D. Allen, Andrei V. Gourov, Christopher Harte, Peng Gao, Clarice Lee, Darlene Sylvain, Joshua M. Splett, William C. Oxberry, Paula S. van de Nes, Matthew J. Troy-Regier, Jason Wolk, Juan M. Alarcon, and A. Iván Hernández (2014) *Nucleolar Integrity Is Required for the Maintenance of Long-Term Synaptic Plasticity.* PLoS ONE 9(8): e104364. doi:10.1371/journal.pone.

Allen K.D., Chernova, T.A., Tennant, E. P., Wilkinson, K.D., Chernoff, Y.O. (2007). *The effect of ubiquitin system alterations on the formation and loss of a yeast prion.* J. Biol. Chem. 28: 3004-13. (Selected by the editors as the JBC paper of the week).

Allen K.D., Wegrzyn R.D., Muller S., Newnam G.P., Ozolins L.N., Winslett P.A., Wittich K.B., Chernoff Y.O. (2005). *Hsp70 chaperones as modulators of the prion life cycle: novel effects of Ssa and Ssb on the Saccharomyces cerevisiae prion, [PSI^{+}].* Genetics 169: 1227-42.

Link to full list of publications: https://orcid.org/0000-0001-9774-5014

Manuscripts Submitted for Excellence Awards - 2025

Each manuscript documented original, empirical research that postulated a testable hypothesis, described the laboratory or field experimental design to test the hypothesis, presented the results, and discussed those results in the context of relevant literature.

Crowley, Ethan, **Mechanisms of Lymphocyte Accumulation in Pulmonary Alveolar Proteinosis.** Neuroscience Program, John Carroll University.

Fullone, Andrew, **Investigating the Effect of Circadian Disturbance and Wheel Activity Restriction on the Metabolism and Hormone Rhythms of Rats.** John Carroll University

Ghanem, Mohammed, **Investigating the Cognitive Enhancing Effects of MCT Wellness Powder in Rats.** John Carroll University.

Ha, Wilson. **Improving Spinal Cord Injury Rehabilitation by Retraining the Brain Using transcranial Direct Current Stimulation: Safety and Feasibility.** John Carroll University.

Lawes, Adriane, **Alcohol withdrawal after chronic exposure increases astrocytic cell coverage in the mouse hippocampal dentate gyrus.** John Carroll University.

Mekhel, Veronica, **Identifying the Novel Role of Fat-Specific Protein 27 (FSP27) in Neurocognition.** John Carroll University.

Messiha, Sandy, **Microglial Bmal1 is a key regulator of deep retinal vascular development in mice.** John Carroll University

Poster Session A
10:30-12:00

A1 **Calfway There: Investigating Muscle Perfusion During Stair Climbing with a Moxy Monitor**
Paul Jacobson, James Moore, Gianna Smith, Grace Warner, Kristen Savell, and Ashley Stoehr, Sacred Heart University

This study aims to compare changes in blood flow (total hemoglobin concentration, THb) and the amount of oxygen available to the working muscle (%SMO2) during periods of rest, activity (e.g., stair climbing), and recovery in different populations. Previous research determined that uphill walking or stair climbing requires increased activity of multiple muscles, including the gastrocnemius. Populations that routinely run uphill (i.e., cross-country athletes) or carry heavy loads up steep inclines (e.g., firefighters, mountaineers) may exhibit physiological changes, such as enhanced blood flow to their gastrocnemius and soleus muscles, which allow for repeated bouts of activity.

Here, we present preliminary data obtained using a Moxy Monitor placed over the lateral side of the gastrocnemius. Individuals then sat for a two-minute rest period, walked on a Stairmaster for 10 minutes at a self-selected speed and moderate intensity, and sat for a five-minute recovery. Following the collection of more data, we predict that individuals who regularly run or carry heavy loads up steep inclines will (a) exhibit a higher THb and SMO2 during rest or work and (b) exhibit a faster recovery of SMO2.

Because endurance or interval training can improve the aerobic capacity of muscle groups by promoting capillarization and adjusting the aerobic capacity of muscles, this research could help individuals refine their training strategies and better assess their physiological responses during uphill travel. This research could also provide insight into whether training significantly enhances these processes or if the adaptation is evolutionarily based.

A2 **3D Printing Patient-Specific Tumor Models from MRI (magnetic resonance imaging) Scans to Improve Surgical Preoperative Planning**

Julia Rossback, Sacred Heart University and Dr. Sarah Poniros, Sacred Heart University.

The purpose of this project is to evaluate the reliability and effectiveness of using 3D-printing technology to convert MRI scans of tumors into patient-specific models. MRIs and CT scans are essential tools used by healthcare providers to visualize internal structures, such as tumors. These methods are used in preoperative planning, which is a critical step in surgery. However, these imaging techniques are limited in their ability to fully display patient anatomy and do not provide surgeons with hands-on practice. By creating 3D-printed tumor models, surgeons can gain a better understanding of a tumor's shape, its vasculature, and its relationship to other anatomical features. This enhanced visualization may improve the precision of preoperative planning, ultimately contributing to more successful surgeries and better patient outcomes.

The methods of this project are three-fold: data collection, 3D printing, and expert analysis. First, anonymized MRI scans of patients were obtained from The Cancer Imaging Archive (TCIA). Then the NBIA Data Retriever software was used to convert the obtained files into DICOM files. The DICOM files were then imported into 3D Slicer, an image computing platform used to segment and isolate tumor structures from their surrounding anatomy. The segmented tumor data was then exported from 3D Slicer as an STL file. The STL file was further processed in PrusaSlicer to prepare for 3D printing. Tumor models will be printed using a Prusa MK4 printer. These 3D printed tumor models, along with the original MRI scans will be evaluated by surgical healthcare providers to help determine their effectiveness and usefulness of the 3D models in preoperative preparations compared to standard MRI scans.

By providing surgeons with a physical representation of a patient's tumor, these models may serve as a valuable tool to enhance surgical precision and improve patient outcomes. Additionally, 3D printing is a relatively cost-effective and time-efficient method for creating these models, making it a tool that is accessible. If successful, this approach could make 3D printed tumor models a standard in preoperative planning.

A3 **Comparing 3D Printed Dental Models to Traditional Molds and Scans**

Isabella Bollini, Dr. Sarah Poniros, Department of Biology, Sacred Heart University

Traditionally, dentists worldwide are using alginate and stone to create impressions and models of their patients' dentition for use in the creation of retainers. This technique can sometimes be wasteful, time consuming, and in most cases expensive. Additionally, this technique can often lead to errors in the final product. The purpose of this project is to determine if scanned and printed 3D printed models can achieve a more accurate result, as well as minimize time commitments and cost to patients. This project will compare the traditional methods of completing dental models to the more modern 3D printed models to determine if this technique is a better option.

Dental offices local to Fairfield County were invited to participate in the study. After being educated on the project, patients will have a traditional dental mold made in the dental office through alginate and stone methods. Then, the patient will also undergo a 3D scan of their dentition with an Itero scanner. That file will be used to create a 3D printed model of the patient's dentition using TPA filament on a PRUSA MK 4 printer. Finally, the traditional molds and the 3D scans will be compared and used to create retainers. Cost, efficiency, accuracy, and the final product will all be scored for accurate comparisons.

There is great potential in 3D models to transform the accuracy and accessibility of necessary dental treatments. After necessary start-up costs, it is estimated that 3D printed dental molds will be significantly less expensive than traditional molds, making necessary dental treatments far more accessible to the average person. It is also estimated that these 3D printed models will be significantly more accurate, and less subject to human error than traditional molds, as well as being faster to produce. There is great potential in using 3D printed dental models.

A4 **Co-culture of Fungi for Developing Mycelial Bio-block Materials**

Derek Davis, Undergraduate in Biology, Eastern Connecticut State University

Fungal mycelium emerges as a sustainable alternative to traditional building materials due to its lightweight structure, biodegradability, and potential for self-healing properties. This study focuses on Trametes versicolor, a polypore fungus with skeletal and binding hyphae, which contributes to both structural integrity and adhesion within composite materials. Previous research supports the use of T. versicolor in mycelium-based bio composites, making it an ideal candidate for bio-block materials. The strain used in this study was cultured from a wild specimen collected at the ECSU Arboretum in Fall 2024. The fungal mycelium will be acclimated to growth in media amended with hydrogen peroxide in order to limit contamination and facilitate working with mycelium in non-sterile conditions. Following this phase, mycelium will be transferred to sawdust-based substrates and molded into 7-inch diameter cylindrical blocks. In future trials, co-culturing with Armillaria sp. will be explored to assess whether its rhizomorphs impart additional tensile strength to the bio-blocks. Once fully colonized, blocks will be subjected to mechanical strength testing using weights to measure breakage and compression resistance. These findings will contribute to the development of stronger, biologically derived materials for potential applications in eco-friendly construction.

A5 **MAPPING THE MAGNETIC FIELDS PRODUCED BY AN ELECTROMAGNET AND OBSERVING THE BEHAVIORAL EFFECTS ON SMOOTH DOGFISH SHARKS (MUSTELUS CANIS)**

† Antonucci, J.1*; Murray, A.2; Simonitis, L.3
1- Eastern Connecticut State University
2- University of Rhode Island
3- Texas A&M University

Sharks have an incredible sensory organ system called Ampullae of Lorenzini which allows them to sense and locate prey. This aids in survival through increase in efficiency, ability to overcome antipredatory mechanisms, and can give them a competitive edge over other predators. Understanding how sharks use their internal compass with their sensory organs is a continuous mystery for elasmobranch scientists. However, furthering the knowledge in this subject can be very beneficial for shark conservation and awareness. The main function currently known of Ampullae of Lorenzini is to respond to weak electrical signals. These faint electrical signals can come from the movements of fish and other living things in the ocean. There is minimal knowledge on the behavior and responses to different concentrations of magnetic field stimuli on smooth dogfish sharks Mustelus canis . In this study we recorded and quantified the behavioral reactions of smooth dogfish sharks Mustelus canis to different levels of magnetic fields (0 V/m, 6.00 V/m, 12.00 V/m). Dogfish sharks Mustelus canis were selected as the suitable species of shark for this experiment due to their abundance in New Shoreham, RI (41.1803° N, 71.5735° W). Not only is their population large in this area, but they also do well in captivity. The most avoidances were observed during the 6.00 V/m and 12.00 V/m trials. Majority of these avoidances occurred within 15 cm of the electromagnet. The results from these observations will further our understanding of how sharks interact with magnetic fields.

A6 **Spatial and Temporal Data Analysis of Tweets from Major US Cities**

Justin Varvaglione, Department of Mathematics, Physics, and Computer Science, Wilkes University, Wilkes-Barre PA 18766

This study utilizes sentiment analysis to compare 198 million tweets from New York, Miami, and Houston from 2017 to 2023. The purpose of this study was to find underlying patterns in the sentiment of these tweets. Spatial analysis was performed on the tweets by comparing the mean sentiment scores of each of the three cities based on ten different emotions over the time period. Temporal analysis was performed by analyzing the sentiment scores of each individual year for a single city and comparing the results of each year. Additional analysis was performed in order to compare the sentiment scores through a full 24 hour day in order to see if results reflected the circadian rhythm.

A7 **Investigating the Effect of Circadian Disturbance and Wheel Activity Restriction on the Metabolism and Hormone Rhythms of Rats**

Andrew Fullone, John Carroll University, University Heights, OH

Circadian rhythm disruptions, such as those experienced by shift workers, are associated with metabolic and hormonal disorders that increase the risk of various health problems. This study aimed to investigate the combined effects of circadian rhythm misalignment and wheel activity restriction on body weight, food intake, adiposity, and key metabolic hormone levels in male and female Long-Evans rats. A 12-hour/12-hour light/dark period was maintained throughout the entire experiment. Male and female rats were divided into control and experimental groups, with the experimental rats receiving restricted feeding during the inactive light period to induce circadian rhythm misalignment. The control rats received restricted feeding during the active dark period, keeping their feeding schedule synchronized with their circadian clock. Body weight and food intake were monitored over a four-week period, followed by post-mortem analysis of adiposity and blood samples to measure the level of key metabolic hormones including: ghrelin, glucagon, insulin, and leptin. Results showed that circadian misalignment significantly impacted body weight, with control groups exhibiting higher body weights than experimental animals. Male experimental rats exhibited significantly elevated leptin levels compared to controls, while female leptin levels showed no significant response to circadian misalignment. Insulin levels varied significantly between the sexes but not between the control and experimental groups, indicating that sex may have more of a profound influence on insulin sensitivity than circadian misalignment. These findings underscore the importance of sex differences in hormonal responses and highlight the potential risks associated with circadian misalignment in sedentary environments.

A8 **Gamifying Quantum Physics**

Kara Foster, Dr. Woodard, Dr. Lucent
Wilkes University

Why not make learning silly and fun? My team of undergraduate students are developing a game that will teach high school students about quantum physics. We are an interdisciplinary team representing majors in Digital Design and Media Arts, Computer Science, and English. Putting together our diverse skill sets to create different aspects of the game. Including but not limited to 3D modeling, UI/UX design, programing, and story creation. Our goal is to make quantum physics seem fun and enjoyable, ultimately trying to get high school students interested in the topic. This game is a virtual reality experience with daffy characters that guide the player through the game while teaching the basics of quantum physics. In this poster presentation, we are showcasing our prototype work the team has created along with the characters and future plans. With the help of faculty from Wilkes University, we are implementing educational methods to ensure that students learn about quantum physics in an engaging way. The player can collect badges when they complete objectives and eventually build quantum puzzles that others will need to solve. These aspects can motivate students to continue playing the game and enhance their knowledge with quantum computing.

A9 **Using Physical Vapor Transport to grow Crystalline Thin Films of Organic Semiconductors**

Meyli Raylan Baker, Department of Electrical Engineering, Wilkes University
Dr. Amy Bradley, Department of Chemistry and Biochemistry, Wilkes University
Dr. Amjad Nazzal, Department of Math, Physics and Computer Science, Wilkes University

Organic Semiconductors have recently gained pronounced interest from researchers of different backgrounds. These new materials have potential applications in the areas of flexible solid optoelectronic devices (Organic Field Effect Transistors, Organic Photovoltaics, Organic LEDs).

Like the doping process in Inorganic Semiconductors, attaching functional groups to the Organic Semiconductor molecules will change the band gap. If we attach electron donors (e.g., Sulfur), this will raise the HOMO, but, attaching electron withdrawals (e.g., NO2) will lower the LUMO, allowing us to manipulate the band gap and thus fine tune the electronic structure of these materials and potentially enables us to control their electronic and optical properties. Effectively, both types will reduce the band gap in Organic Semiconductors, which are often referred to as Donor-Acceptor, or, Donor-Acceptor-Donor molecules when there is presence of these moieties. Additionally, if we arrange large number of these molecules in solid crystals, this will enhance the electronic properties (electric conductivity, oscillator strength, etc) and allow us to employ these materials in solid state device applications.

We developed a reproducible synthesis recipe for the Organic Semiconducting molecule Benzo[a]benzo[5,6][1,4]oxazino[3,2-c]phenoxazine (C22H12O2N2), using 2,3-dichloro-1,4-naphthoquinone along with aminophenols with various withdrawing and donating groups to synthesize a handful of asymmetrical DDBA structural analogs.
One of the goals of the current project is to test if we can assemble this family of molecules into thin crystalline films using Physical Vapor Transport growth technique.

A10 **Improving Spinal Cord Injury Rehabilitation by Retraining the Brain Using Transcranial Direct Current Stimulation: Safety and Feasibility**

Wilson Ha, John Carroll University, University Heights, OH

This study evaluates the safety, feasibility, and preliminary outcomes of using transcranial direct current stimulation (tDCS) as an adjunct to physical rehabilitation for improving upper extremity function in individuals with chronic tetraplegia resulting from traumatic spinal cord injury (SCI). Among 47 enrolled participants, 38 completed sufficient sessions for analysis, with 553 therapy sessions conducted overall. Blood pressure monitoring revealed significant but small increases in systolic and diastolic values during therapy, with average changes remaining below the 20 mmHg threshold associated with autonomic dysreflexia risks. Adverse Events (AEs), both tDCS-related and non-tDCS-related, were predominantly mild and did not result in significant harm or severe complications. The most frequent tDCS-related AE was a burning sensation, reported in 39.2% of sessions, with a mean intensity of 4.4/10. Preliminary results indicate that the intervention is well-tolerated, with no major safety concerns. While the real and sham groups remain blinded, early findings suggest the potential for this upper extremity rehabilitation paradigm to improve motor function. The study design, robust AE monitoring, and adherence to safety protocols highlight the feasibility of integrating tDCS into SCI rehabilitation. These findings provide foundational evidence for the future unblinding and analysis of efficacy data, which will be critical for determining the therapeutic impact of tDCS and its long-term effects on health outcomes of individuals with chronic SCI.

A11 **Behind the Screen: A Content Analysis of Thumbnails for Shorts and Videos on YouTube Kids**

Aesiah Jeremiah and Jillian Cretella
Dept. of Psychology, Ithaca College, Ithaca, NY 14850

Children's TV content has long raised concerns about its impact on their beliefs, attitudes, emotions, and behaviors. Previous studies of gender messages in children's TV programs, for example, have found that girls and women are often underrepresented and portrayed in stereotypical ways (Signorielli, 1990; Witt, 2012). However, despite the growing popularity of digital media, there have been few studies of the content or impact of videos targeting children from streaming platforms like YouTube Kids. Tahir et al. (2019) and Papadamou et al. (2019) both studied the moderation of children's videos, highlighting the impact of algorithm-driven recommendations. The current study is a descriptive content analysis of thumbnails for YouTube Kids videos targeting different age groups. Screenshots of thumbnails for the videos were collected between the months of October and December 2024, representing the first 16 thumbnails shown in each of 6 categories (recommended, music, shows, learn, explore, gaming) for ages 5-8 and 9-12. A total of 2,640 thumbnails were analyzed by individual coders on the CRETV research team at Ithaca College, evaluating the content and characters shown in the thumbnails. Across both age groups, the most frequent content shown was related to music, education, gaming, challenge and humor. Male characters were more likely to be shown than female characters, and males were more likely to be shown as adults while females were more likely to be shown as children. About 20% of the thumbnails portrayed observable gender stereotypes. Implications for the potential impact of these videos on children will be discussed.

A12 I**nvestigating the Cognitive Enhancing Effects of MCT Wellness Powder in Rats**

Mohammed Ghanem and Toby Khalil, John Carroll University, University Heights, OH

Medium-chain triglycerides (MCTs) have gained attention for their potential as cognitive enhancers due to their unique metabolic properties. Unlike long-chain fatty acids, MCTs are rapidly metabolized, providing a quick energy source that may benefit brain function. While MCTs have been studied in clinical populations, their effects on cognitive performance in healthy individuals remain underexplored. The current study investigated MCT supplementation and cognitive functioning by utilizing spatial memory and learning employing rats. Subjects were divided into two groups: an experimental group receiving MCT wellness powder mixed with a condensed milk "treat" and a control group receiving only the condensed milk. Both groups were tested in a T-maze task, a commonly utilized test for assessing spatial memory and learning in rodents. Food and water intake, as well as body weight, were monitored daily throughout the study to examine metabolic changes associated with MCT consumption. No significant differences were observed in T-maze performance between the groups, indicating that short-term MCT supplementation may not directly impact spatial memory and learning. However, the experimental group exhibited significantly higher food and water intake than the control group, suggesting altered metabolic activity. Further research could be conducted to clarify the potential cognitive benefits of MCTs utilizing longer intervention periods.

A13 **Identifying the Novel Role of Fat-Specific Protein 27 (FSP27) in Neurocognition**

Veronica Mekhel, John Carroll University, University Heights, OH

Fat-specific protein 27 (FSP27) was previously recognized for its role in adipocyte fat metabolism. Recent studies showed that it is also crucial for lipid metabolism in muscle cells, impacting energy homeostasis and skeletal muscle function. Interestingly, the metabolic state of muscle tissue has been shown to influence brain function and overall cognitive health. Therefore, it was hypothesized that muscle-specific FSP27 plays an important role in neurocognition. To test the hypothesis, muscle-specific Fsp27 knockout mice (M-Fsp27ko) were utilized. M-Fsp27ko mice and their floxed controls, aged 12 months, were subjected to endurance and strength tests, including treadmill running and four-limb hanging grid tests, to assess muscle performance. Neurocognitive function was evaluated using the Morris water maze and a labyrinth maze. M-FSP27ko mice showed significantly lower endurance and muscle strength compared to their floxed controls. Additionally, the knockout mice exhibited notable behavioral differences, highlighting a significant neurocognitive impact linked to the Fsp27 gene. In the Morris water maze, reduced neurocognition was observed in M-Fsp27ko mice, evidenced by fewer crossings over the target area and increased latency to find the target area compared to their floxed controls. In the labyrinth maze, M-Fsp27ko mice displayed impaired learning, evidenced by longer times to complete the maze and no reduction in time over trials. Overall, the findings suggest that knocking out FSP27 in skeletal muscle also has downstream effects on neurocognitive health. Future studies could explore the specific pathways linking muscle FSP27 to brain function, which would help identify the molecular pathways regulating metabolic and neurocognitive disorders.

A14 **The Role of Dorsiflexion ROM in Human Biomechanics During Slope Walking**

Gianna Smith and Grace Warner, Sacred Heart University

Incline-walking requires excess energy expenditure causing an increase in metabolic cost compared to walking on horizontal ground. We hypothesize that a limiting factor could be ankle dorsiflexion range of motion. Understanding the factors that limit increased energy expenditure is crucial for improving our understanding of human biomechanics and optimizing performance.

In this study, eight healthy, adult participants (6 female, 2 male) completed a series of anthropometric measurements (weight, height, and body proportions) and ankle dorsiflexion range of motion (ROM) test, followed by metabolic data collection during incline walking. ROM was measured using a weight bearing lunge test. Metabolic cost (V02) was measured during treadmill walking at different inclines (20%, 30%, 40%) while participants wore an oro-nasal mask. Walking trials were conducted at each incline for 5-minute intervals, with participants walking at their preferred pace. Metabolic data was recorded during baseline standing and walking trials, and heart rate was monitored to ensure steady state was achieved at each incline. Expected energy cost was determined using a standardized equation. Pearson correlations were then calculated to examine relationships between Actual - Expected METs and ankle ROM. These correlations, while positive, are low ($R2 < 0.2$). However, preliminary linear models indicate significant relationships between standardized limb length measures and metabolic efficiency (METs) when ROM is included in the mode.

We plan to expand our sample size to increase the power of our models and produce a clearer assessment of the role of ankle dorsiflexion and limb length on energy expenditure in slope walking.

A15 **Characterization of a Novel Mutation in Coagulation Factor X**

Ellen Haverstick[1,3], Matthew Bunce PhD[1], Rodney Camire PhD[1,2]
[1]The Children's Hospital of Philadelphia Research Institute, Department of Pediatrics – Hematology Division, Philadelphia, PA, [2]Perelman School of Medicine at the University of Pennsylvania, Department of Pediatrics, Philadelphia, PA [3]Pace University, New York, NY

Factor X (FX) plays a crucial role in the coagulation cascade, and mutations in FX that affect either its activation or activity may disrupt normal coagulation. Here, we characterize a novel FX mutation, D48G, identified in a patient with prolonged PT but normal aPTT clotting times with no history of bleeding problems. Interestingly, this D48G mutation is located two amino acids away from the previously reported FX-Riyadh (E51K) mutation. Like FX-D48G, FX-E51K has prolonged PT, normal aPTT, and does not present with bleeding diathesis.
To investigate the mechanism underlying this phenotype, FX-deficient plasma was supplemented with purified recombinant FX-D48G, FX-E51K, or wildtype FX (FX-WT) and coagulation was analyzed using clotting assays and thrombin generation assays (TGA). In clotting assays, FX-D48G and FX-E51K had extremely weak activity compared to FX-WT in PT assays, but retained significant activity in aPTT assays, consistent with the clinical presentation of patients. In TGAs FX-D48G, FX-E51K, and FX-WT had similar activity when thrombin generation (TG) was initiated with either tissue factor (TF) or aPTT reagent. Interestingly, adding inhibitory anti-FVIII antibodies to these TGAs almost completely prevented TG by FX-D48G and FX-E51K, whereas TG from FX-WT was only slightly reduced. These results suggest that FX-D48G and FX-E51K primarily impair FX activation via the extrinsic pathway (FVIIa/TF), while activation by the intrinsic pathway remains sufficient to maintain normal TG, explaining the lack of bleeding diathesis.

A16 **Investigating the Role of DnaE-SSB Interaction in DNA Replication and Repair in Bacillus subtilis Under UV-Treatment**

Ariana Dominguez, Department of Biochemistry and Chemistry, Fordham University
Elizabeth Thrall, Department of Biochemistry and Chemistry, Fordham University

Antibiotic resistance is a rising global threat that causes around one million deaths annually with numbers expected to rise. Understanding the multipart mechanisms in bacterial DNA replication is essential in combating this growing crisis. Bacillus subtilis, the model gram-positive bacterium, contains two replicative polymerases, DnaE and PolC. The dynamics of the replisome during replication are poorly understood and gaining a detailed understanding of the protein interactions in B. subtilis may aid in developing treatments against human pathogens and other gram-positive species that contain PolC and DnaE by inhibiting replication. During DNA replication, single-stranded DNA binding proteins (SSB) bind to single-stranded DNA while recruiting accessory proteins via its C-terminal tail. Studies have shown that DnaE binds to the C-terminus of SSB, but its role during SOS responses triggered by DNA damage remains unclear. This study investigates the impact of the DnaE-SSB interaction on DNA replication dynamics under UV-induced damage. We began by establishing that DnaE is upregulated in response to DNA damage using genetically modified strains expressing wild-type SSB. Single-molecule fluorescence microscopy and single-particle tracking revealed the localization dynamics of DnaE relative to replication sites, which revealed that DnaE is upregulated post-treatment. This upregulation reveals a potential vulnerability that occurs during DNA repair and replication, suggesting a possible way to target replicative polymerases. Next, we will analyze strains with truncations to the SSB C-terminal, which disrupt DnaE-SSB binding. Elucidating the DnaE-SSB interaction contributes to a molecular understanding of the replisome in gram-positive bacteria which provides a foundation for creating treatments that disrupt essential DNA replication mechanisms.

A17 **Investigating the Role of Hmo1 in Facilitating RSC-Mediated Chromatin Remodeling**

Lina Amraoui, Dr. Bryan Wilkins,
Kakos School of Arts and Sciences, Manhattan University, Riverdale, New York

Chromatin is assembled through repeating units of nucleosomes, consisting of DNA wrapped around an octameric unit of histone proteins (H3, H4, H2A, and H2B). When DNA is associated with a nucleosome, it is silenced and must be unwound from the histone proteins to be used for processes such as replication and transcription. Recent research suggests that Hmo1, a high-mobility group (HMG) protein in yeast, plays a role in chromatin organization and transcription regulation. Unlike canonical linker histones, Hmo1 facilitates transcription by stabilizing open chromatin structures rather than compacting them.

To investigate Hmo1's role in chromatin dynamics, we aim to introduce an HA-tag to facilitate protein detection and interaction studies. So far, we have performed PCR and transformation to integrate the HA-tag into the HMO1 gene, but further validation is needed to confirm successful tagging. Once integrated, this tagged version of Hmo1 will allow us to study its interactions with chromatin remodelers such as the RSC complex.

This work lays the groundwork for future studies on Hmo1's function in chromatin accessibility and transcription regulation, helping to clarify its role in gene expression.

A18 **Examining the metabolic dynamics of red and white quadricep muscle tissues through ATP and ADP turnover analysis**

Pithiya D' Costa, Department of Chemistry and Biochemistry, Fordham University
Yunping Qiu, Department of Medicine (Endocrinology), Albert Einstein College of Medicine
Irwin J. Kurland, Department of Medicine (Endocrinology), Albert Einstein College of Medicine

Mitochondrial dysfunction is one of the most common causes of metabolic syndrome (MetS), which is characterized by insulin resistance, obesity, hypertension, and dyslipidemia. Red muscle fibers, which are abundant in mitochondria, and white muscle fibers, rich in anaerobic activity, are both crucial for maintaining insulin sensitivity and metabolic flexibility. However, in individuals with MetS, mitochondrial function in these muscle fibers is usually impaired, leading to reduced oxidative capacity (hence), a decrease in energy production, exacerbating insulin resistance, and causing fat accumulation, highly risking the chances of atherosclerosis, myocardial infarctions, strokes, and death. With the prevalence of MetS only increasing among the global population, it is imperative to understand the underlying metabolic dynamics of these muscle fibers in order to assess and treat metabolic impairment under various physiological and biochemical conditions. To address this, we precisely assessed the nucleotides, ADP and ATP turnover rates in white and red quadricep muscle fibers using 18O-labeled water, and liquid chromatography mass spectrometry (LC-MS). The number of mitochondria in red muscle fibers can be two or three fold that of mitochondria found in white muscle fibers which is why it is widely speculated that red muscle fibers are likely to have higher nucleotide turnover rates, hence, greater energy production. Unexpectedly, the time course for the enrichment of one18O exchange with the end phosphate of ADP and ATP was similar between white and red quadricep muscles, but the final enrichment at 10 minutes were approximately 15% lower for white vs red quadricep muscles (which aligns with their relatively lower mitochondrial activity and lower oxidative metabolism). This finding suggests that the maximum ADP and ATP turnover is dependent on the mitochondrial mass of muscle tissue. The limited alpha phosphate labeling in both muscle types suggests that the ATP synthesis and utilization cycle predominantly involves gamma phosphate exchanges rather than complete ATP breakdown and resynthesis. This insight supports that most ATP dependent processes in muscle fibers operate on terminal phosphate hydrolysis rather than complete degradation to ADP or AMP, all in all, proposing a model where the differential turnover rates in correlation to mitochondrial mass can be used as insight to further develop and modify muscle-specific treatments aimed at enhancing mitochondrial mass and activity to increase overall energy production and insulin sensitivity.

A19 **Decoding Heart Failure: The Enzyme Connection in Muscle Lysates**

<mnovominski@gmail.com>

Heart failure is a prevalent and potentially life-threatening condition that has emerged as one of the leading causes of death worldwide. Literature suggests that differential protein expression in blood during early HF may contribute to symptoms. This study examines key enzymes in muscle tissues to understand pathophysiological mechanisms. Three principal enzymes—lactate dehydrogenase (LDH), malate dehydrogenase (MDH), and acetylcholinesterase (AChE)—were analyzed for isoform alterations in HF. Muscle samples from control (healthy) and end-stage HF patients were pulverized in liquid nitrogen, frozen at -80°C, rehydrated, re-centrifuged, and preserved before electrophoresis. Diazonium salt staining identified enzyme banding patterns in the right atrium (RA), left ventricle (LV), aortic (AO) smooth muscle, and gracilis skeletal muscle (SM). Gel electrophoresis (ND-PAGE) revealed subtle isozyme variations. HF specimens showed one fewer LDH activity band. MDH activity remained consistent across all muscle types, while AChE activity exhibited subtle changes, notably increasing in LV samples. Gavazza et al. (2020) proposed that blood isoenzymes might serve as HF biomarkers, offering prognostic insights and aiding early detection. Monitoring these enzymes could improve diagnosis and treatment, allowing healthcare professionals to intervene earlier in disease progression. The integration of advanced diagnostics with a patient-centered, holistic approach underscores the critical role of clinical nursing in managing HF. By identifying biochemical markers linked to HF progression, nurses can contribute to improved patient outcomes through early intervention and personalized care.

A20 **Alcohol withdrawal after chronic exposure increases astrocytic cell coverage in the mouse hippocampal dentate gyrus**

Adriane Lawes, John Carroll University, University Heights, OH

This study aimed to better understand the role of neuroimmune cells such as astrocytes in the event of a central nervous system insult such as the one seen in alcohol use disorder (AUD) resulting from chronic alcohol exposure and subsequent withdrawal. Nine-week-old adolescent CL57B/6 mice were fed a control or 5% alcohol-containing liquid diet for four weeks before changing their diet to reflect a withdrawal period. Following transcardial perfusion, sectioning, immunohistochemistry, and confocal imaging, preliminary results were generated by comparing the relative percent area covered by astrocytes in the hippocampal dentate gyrus for the pair-fed control group and the experimental alcohol exposure (EtOH) group across three time points: 3.5 weeks into alcohol exposure, 24 hours into alcohol withdrawal, and 4 weeks into alcohol withdrawal. Analysis of the data found that the percent area covered by astrocytes between the control and EtOH groups did not change at 3.5 weeks into alcohol exposure and at 24 hours after alcohol withdrawal, but significantly increased at 4 weeks after alcohol withdrawal. This finding indicates that astrocytes are involved in the development of AUD and provides a basis for future studies into the specific role that astrocytes play in this process.

A21 **In Vivo Approaches to Investigating Chromatin Dynamics and Protein-Histone Interactions**

Farzin, H.E., Roman, J., Wilkins, BJ.
Kakos School of Arts and Sciences, Manhattan University, Riverdale, New York

Chromatin structure consists of repeating units of nucleosomes, which contain DNA wrapped around a histone protein octamer. This octameric core is composed of four basic proteins, H3, H4, H2A, and H2B, with the purpose of compacting DNA so that it fits within the confines of the nucleus. How DNA is regulated at the nucleosomal level and what controls enzymatic DNA access is well studied but not conclusive. Over the years, varying experiments have been performed to determine which proteins, when bound to specific points on the histone, affect the unwinding transcription of DNA. Importantly, most of these studies require in vitro approaches that do not convey results under true physiological conditions. Here, we approach the study of chromatin dynamics and histone-protein interactions through the use of artificial amino acids and UV induced cross-linking mechanics. Via the amino acid, p-benzoylphenylalanine (pBPA), we selectively incorporate the crosslinking probe, in vivo, and assay histone-protein interactions in the living yeast nucleus. This method allows us to identify proteins that make contacts to the nucleosome as well as identifying chromosomal positioning along the chromosome. The artificial amino acid allows for superior tracking of the proteins and their interactions and can easily be visualized through western blot analysis. The implementation of this procedure allows for analytically detailed analyses of nucleosomal dynamics and the role of chromatin related proteins in the regulation of DNA transcription.

A22 **A COMPARATIVE ANALYSIS OF MICROPLASTICS IN SOUTH KOREAN AND AMERICAN SEAWEED**

Aleksandra Belugin, Lynn Maelia
Mount Saint Mary College, Newburgh, NY 12550

Microplastics are small fragments of plastic less than 5 millimeters in size, that are either intentionally added to products like cosmetics or formed by breaking down larger products over time. Microplastics have different forms, most often seen as shards, microbeads, and fibers. They can accumulate in the environment and present a risk to the health of humans and wildlife. Microplastics can leach their chemicals into the environment, disrupting ecosystems, and can be mistaken for food by marine animals, leading to harm, such as internal blockages and accumulation in an organism's tissues.

In this study, we examined and compared the microplastic content of seaweed from South Korea and Maine in the United States. Seaweed samples from two commercial brands were digested and filtered; filters then were observed via microscopy for microplastic content, and an Excel-based algorithm was used to estimate total particle counts of seaweed from both sources. Ocean's Halo Seaweed from Korea had an average of 59 ± 19 particles per gram, 31% of which were fibers and Maine Coast Sea Vegetable seaweed had 44 ± 13 particles per gram, 70 % of which were fibers. A Student's t-test was used to compare the two seaweed brands, and there was no statistically significant difference between the total numbers of microplastic particles ($p = .14$). In the future, we plan to examine and characterize the identity of the different plastics and look at seaweed and other organisms from local sources.

Platform Presentations B
11:15-12:30

B1 **Comparing temporal patterns of horseshoe crab parasite loads in Long Island Sound**

Alyssa Mancini
Sacred Heart University

The American Horseshoe Crab (Limulus polyphemus) is an important species in the ecosystem on the Eastern coast of the United States. Horseshoe crabs in high densities serve as a foundational species, increasing local biodiversity by providing food to many other organisms. The population of horseshoe crabs in the Long Island Sound has been declining in recent decades due to overharvesting, pollution, and loss of shoreline habitat. Additionally, horseshoe crabs are susceptible to gill parasites such as the limulus leech (Bdelloura candida). Horseshoe crabs were studied between 2021 and 2023 along the Connecticut (CT) coast to determine what factors influence parasite loads over time and if parasites could be impacting the population overall. Gills were ranked based on percent covered in parasite eggs as well as the presence of adult parasites on a scale of 0-4. In addition to parasite load, sex, size and nesting beach were also recorded for each crab. The data are pending further analysis, but preliminary results indicate that larger crabs have more parasites. Limulus observed in 2023 seemed to have higher parasite loads compared to crabs observed in 2021. This data has meaningful implications for horseshoe crab conservation and management in CT.

B2 **Analysis of Microbial Community Structure Reveals Significant Differences Between River Basins on the Dingle Peninsula of Ireland**

Mary McManus and Megan Prettyman
Sacred Heart University

The Feohanagh, Milltown, and Owenmore rivers of the Dingle Peninsula on the southwest coast of Ireland drain conjoined basins of approximately equal size and shape. While these rivers occupy similar spaces of land, the land surrounding the basins serves different purposes and varies substantially in land-use and land-cover (LULC). Our specific aim was to compare the planktonic microbial communities at the outflow region of the rivers for spatial and temporal variation. Five water samples were taken from each of the three rivers at two different timepoints, and Illumina sequencing of the 16S and ITS rRNA regions was conducted to identify bacterial and fungal species, respectively. Statistically significant differences in both community composition and absolute abundance were observed between rivers and also within rivers between timepoints. We are continuing our analyses to identify the significant species driving the observed differences by looking at subgroups representing the top 80% of microbial biomass, the bottom 20% of microbial biomass, and the dominant species represented by more than 100,000 individual genomes/sample. We will also present the results of analyses to correlate observed differences with differences in LULC between the three river basins.

B3 **Hho1 as an Epigenetic regulator: Identifying protein-protein interactions between histone H3 and the Saccharomyces cerevisiae linker histone, Hho1**

Joseph A. Campolo, NREMT, Department of Biological and Chemical Sciences, Manhattan University

This research aims to enhance our understanding of Hho1 as a transcriptional regulator via direct protein-protein interaction with histone H3 (H3), detailing the contacts made between these two proteins. Current literature suggests that Hho1, and its homologs, play a critical role in gene repression and that Hho1 makes direct contact with H3 during this process.In order to further investigate how linker histone - H3 interactions regulate chromosomal dynamics, we employed the artificial crosslinking amino acid, p-benzoylphenylalanine (pBPA), which was installed through site-specific genetic encoding, to scan for H3 N-terminal tail - Hho1 binding. When pBPA is activated with 360 nm light it undergoes covalent crosslinking with a genuine protein interacting partner. We expressed H3 harboring pBPA, at thirteen sites, in a cell line that carried a gene for Myc-tagged Hho1. Crosslinking was performed in living cells, and analyses of potential protein-protein interactions were conducted at the P6, T11, G12, A15, P16, L20, S22, A25, G34, V35, R40, R52 and T80 sites. Following an immunoprecipitation via myc antibodies and then western blotting against our histone, we identified four potential protein-protein interactions at G12, A15, P16 and L20 sites. The H3 N-terminal tail is laden with PTMs that likely govern how these proteins function in tandem. We have begun to install mutations to inhibit PTMs across the tail to determine how a loss of modification alters the crosslinking efficiency. Ultimately, this work provides us the ability to study how liker histones bind the nucleus and better define their roles in chromatin dynamics.

B4 **EVALUATING THE IMMUNE RESPONSE IN MICE FOLLOWING INTRAVENOUS EXPOSURE TO THE ARTIFICIAL OXYGEN CARRIER OXYVITA®**

Alina Mendelowski, James Moran, PhD
Mount St. Mary's College

Hemoglobin Based Oxygen Carriers (HBOCs) may provide a viable substitute for blood in emergencies. These oxygen carriers are like hemoglobin, which carries oxygen around the body. OxyVita is an HBOC composed of polymerized bovine hemoglobin tetramers produced at OXYVITA Inc. in Middletown, NY. This polymer is currently undergoing preclinical testing to determine its safety and efficacy. Previous studies have shown that repeat exposures in the peritoneal cavity (IP) caused a robust antibody response to the OxyVita polymer, which continued to increase after subsequent exposures. Importantly, OxyVita treated mice gained weight at the same rate as the saline control mice, which is a good first indicator of the health of the mice. Our current studies evaluated the antibody response in mice exposed through the intravenous route (IV), which better approximates the intravenous infusions used in emergency medicine. Antibody production was measured through our established ELISA protocol. The results demonstrated that the quantity of circulating antibodies present following IV exposure was similar to that of the IP mice, demonstrating an adaptive immune response. This then led to strong memory responses with subsequent exposures. Future studies will continue to assess the safety of repeated OxyVita exposures through the IV route.

B5 **The Hidden Danger: Toxicity of Tire Wear Particles on Daphnia**

Amelia Meneses, Bridget Atland, Samantha Funk, Dr. Susan Allen
Ithaca College

Tire wear particles (TWP) are a type of microplastic that shed from car and truck tires as they degrade. These particles are an emerging environmental concern because of the widespread use of tires and the potential toxicity of TWP to ecosystems. This study investigates the effects of tire wear particles on the mobility and behavior of immature daphnia magna. 48-hour toxicity tests were conducted to assess the impact of varying concentrations of TWP on daphnia mobility and behavior. Imaging analysis revealed that TWP stuck to the outer body of the daphnia, with some particles being internalized. The mobility tests revealed significant differences in the number of immobile daphnia in treatments not exposed to TWP versus those exposed. We found that a total of 12 out of 30 daphnia were immobile after 48 hours in the control treatment, versus 23 out of 30 daphnia immobilized in the highest TWP group. In a second study, daphnia movement patterns were analyzed using Ethovision software after 48-hour exposure to TWP. The Ethovision trials revealed that of the daphnia still mobile after 48 hours, those exposed to TWP moved 2 to 3 times more on average compared to those not exposed to TWP. One potential explanation for this is that daphnia were exhibiting more erratic behavior prior to becoming immobilized completely. Our findings show the potential ecological implications of TWP in aquatic environments, particularly regarding the health and mobility of these key aquatic organisms.

Poster Session C
1:30-3:00

C1 **Investigating Calcineurin-Mediated Calcium Signaling in Yeast Using Crz1p-GFP Fluorescence Microscopy**

Marcus Fakhoury, Iona University

Calcineurin is an essential Ca^{2+}–calmodulin-dependent serine/threonine protein phosphatase that plays a role in cellular stress responses across eukaryotes, including fungi and animals. Calcineurin is a heterodimer composed of a catalytic subunit (CNA) and a regulatory subunit (CNB). The regulatory subunit binds Ca^{2+} through four EF-hand domains to regulate phosphatase activity. Previous studies had shown that cnb1 alleles containing mutations that prevented calcium from binding to EF1 and EF2, significantly reduced calcineurin-dependent reporter gene expression, while EF3 mutations caused a partial reduction, and EF4 mutations were not statistically different from wild-type. However, reporter gene assays are semiquantitative, as they do not measure calcineurin activity directly. Therefore, a more direct measure of calcineurin activity would be beneficial in understanding the phenotypic differences of these mutants. Because activated calcineurin dephosphorylates the transcription factor Crz1p causing its translocation into the nucleus, we obtained a Crz1p-GFP construct and plan to monitor changes in nuclear localization by fluorescence microscopy under a variety of calcium signaling conditions. Preliminary control studies indicate that we are able to detect cytoplasmic Crzp-GFP in WT cells which translocates to the nucleus in the presence of calcium in a calcineurin-dependent manner. Further studies will examine the phenotypes of the various EF mutants of calcineurin by monitoring Crz1p localization and correlate these phenotypes to the original reporter gene assays.

C2 **Characterization of novel *Drosophila* Egf receptor signaling targets with roles in eggshell structure and morphology**

Kayla Eckrote, John Tondora, Megan Robinson and Lisa Kadlec
BESS Department, Wilkes University

Signaling by the *Drosophila* epidermal growth factor receptor (Egfr) plays a critical role in many aspects of development, including oogenesis, embryogenesis, and wing and eye development. For example, Egfr signaling has a well-established role in the ovary, where it is crucial for establishing the body axes. Our lab previously identified potential novel downstream transcriptional targets of the Egf receptor using the *Drosophila* ovary as a model system. Our initial work compared gene expression in fly ovaries where activity of the Egfr pathway was reduced, normal, or constitutively active. A small-scale functional screen taking advantage of UAS-RNAi transgenic flies to knock down gene expression, as well as available P-element insertion mutants, was used to investigate the possible functions of a group of our novel Egfr-responsive genes. A number of these genes were observed to have roles in normal eggshell structure and morphogenesis, rather than patterning. Gene mutant/knockdown phenotypes include decreased chorionic integrity, shortened eggs, and various dorsal appendage malformations, as well as decreased fertility. We have used the CRISPR-Cas9 system to create mutations in several of these "morphogenesis genes" to further explore their functions. Characterization of these mutants has revealed expected (previously observed), and in some cases additional, eggshell phenotypes. We are continuing to evaluate our most recently created CRISPR mutants, for example by assessing fertility and quantitatively analyzing morphological changes. Additionally, we are using our CRISPR mutant lines, in multiple genes of interest, for further study investigating possible underlying ovarian defects via fluorescence microscopy to look at ovary structure.

C3 **Examining the effects of microgravity on cellular senescence**

Derek Laux, Department of Biology, Eastern Connecticut State University
Marissa Paquette, Biology Major, Eastern Connecticut State University

During space travel, astronauts are exposed to a variety of environmental hazards including space radiation and microgravity. These hazards can stimulate molecular and cellular changes that may lead to long-term health problems. . Scientists have observed a pattern of age-related diseases, such as cancer and heart disease, emerging in astronauts upon their return to Earth. The mechanisms leading to these health problems remain unclear. One explanation is that microgravity may lead to cellular senescence, the irreversible arrest from the cell cycle. This study investigates the effects of microgravity on development and cellular senescence using zebrafish as a model organism. Here, we exposed zebrafish to conditions of microgravity using the NASA rotary cell culture system. Zebrafish embryos exposed to microgravity appear normal but display increased expression of senescence-associated markers and altered gene expression. Furthermore, microgravity impacts embryo behavior suggesting senescent-related muscle decline. In the future, we aim to uncover the mechanisms behind microgravity-induced cellular senescence and identify potential interventions or therapies to counteract these effects. As mission durations extend, it will be beneficial to uncover ways of improving astronaut health.

C4 **Determination of Native Haplotypes of Phragmites australis plants from Manitou Marsh, NY**
Blessing Forson, Iona University

Phragmites australis, the common reed plant, is considered to be an invasive species that has become one of the dominant plants growing in salt marshes (and elsewhere) throughout much of the United States. However, native P. australis plants do exist and a stand of these native plants has been discovered in Manitou Marsh, NY. This study uses molecular biology techniques that combines PCR amplification, ligation into plasmid, DNA mini-prep, gene transformation and gel electrophoresis to discover the specific native haplotypes of these particular plants. Determining the haplotype of Phragmites australis is important for understanding the genetic diversity of this species as well as studying its ecology in part, to manage this species as an invasive. Results of this study will be presented.

C5 **Discovery of genes for heavy metal accumulation in Phragmites**

Tanya Koshy, Dr. Yourha Kang, Department of Biology, Iona University.

Phragmites australis, also known as a common reed, is a widely distributed invasive plant species found throughout North America and Europe. This species has shown to be an accumulator of heavy metals and it has been suggested that it be used for the phytoremediation of contaminated soil, water, or sediments. However, there is not a lot of evidence as to what the mechanism of action P. australis takes in order to accumulate heavy metals. This research project aims to discover genes in Phragmites that are involved in heavy metal accumulation. Thus far, candidate DNA sequences were PCR-amplified from Phragmites using gene sequences from known accumulators in other species using 5' and 3' RACE. This study aims to ligate the sequences into the pRACE vector, clone into E. coli, and then eventually sequence the DNA to determine if metal-accumulating genes are found in Phragmites. Research is still ongoing, and results can be seen below.

C6 **Transcriptomic Analysis of Thermally Stressed Montipora capricornis and Symbiodinium sp. Uncovers Novel Pathways Associated With Coral Bleaching**

James Hill, Jeanmaire Molina PhD (Mentor)
Pace University

Mass coral bleaching events have increased in frequency and severity over the last decade, primarily driven by rising ocean temperatures. These events are characterized by the loss of dinoflagellate symbionts from coral tissues, a stress response that is believed to result from the breakdown of symbiosis between coral and dinoflagellate. Current theories indicate possible oxidative damage and thermal stress-related photosystem dysfunction resulting in decreased photosynthetic rates. Despite growing evidence for these theories, the precise molecular mechanisms underlying symbiont expulsion remain unclear. This study employs Nanopore transcriptome sequencing to identify and quantify genes associated with the bleaching process in both the coral host (Montipora capricornis) and its symbionts (Symbiodinium sp.) under thermal stress (31°C for 7 days) compared to healthy controls (24°C). The resulting data were compared to published Illumina transcriptome datasets to validate differentially expressed genes and pathway enrichment patterns. Gene expression patterns reveal substantial shifts in expression for Symbiodinium sp. under thermal stress. Illumina data revealed that healthy symbionts exhibit enriched dynein and cilium-related functions, microtubule-based movement, and calcium ion binding, which support intracellular transport, motility, and homeostasis. Nanopore data had similar findings, particularly in a drastic up-regulation of calcium-ion binding as well as photosystem-II electron transport function in non-thermally stressed Symbiodinium sp.

In contrast, thermal stress was shown to upregulate carbohydrate metabolism, methylation, and catalytic activity, indicating increased energy demands and stress adaptation. Additionally, there was a depletion of immune-related pathways and an enrichment in metabolic pathways during thermal stress, reflecting a reallocation of cellular resources towards stress mitigation. Ultimately, these findings highlight possible key molecular pathways underlying coral bleaching, offering promising avenues for targeted conservation strategies to bolster coral resilience in steadily warming oceans.

C7 **DNA Extractions and PCR Amplification to Identify Meiofauna in Sediment from a Disturbed Shoreline**

Alexander Besnilian1, Mikayla Tucci1, Lisa Piastuch2, Ashley Stoehr1, and Alyssa Woronik1
1 Sacred Heart University
2 University of Connecticut, Avery Point

Meiofauna are a diverse group of benthic invertebrates that range between 0.04 mm and 1mm in size. They represent 24 of the 35 animal phyla and are ideal for biomonitoring. Their fast population turnover means that community composition can indicate anthropogenic influence and environmental health. The long-term goal of this project is to determine if visual identification of meiofauna at the level of phyla is sufficient to investigate community changes along a disturbed shoreline (Seaside Park; Bridgeport, CT); or if it is necessary to identify lower taxonomic levels via DNA metabarcoding. The latter would allow for the identification of taxa at genus or species levels based on a short variable region in the DNA. We previously optimized a protocol to extract DNA from the sediment samples using the Qiagen DNeasy PowerSoil Pro Kit. Currently, we have generated DNA extractions from sediment samples that range across time and space and conducted PCR on these extractions to amplify a variable region of the 18S rRNA gene. We will be sequencing these amplicons to identify taxa within the sediment samples.

C8 **Microglial *Bmal1* is a key regulator of deep retinal vascular development in mice**

Sandy Messiha, John Carroll University, University Heights, OH

Circadian rhythms, the natural biological processes that follow a 24-hour cycle, are essential for regulating homeostasis across various physiological systems, including retinal health. Recent studies suggest that proteins encoded by circadian rhythm genes, such as brain and muscle arnt-like protein-1 (*Bmal1*), may influence retinal angiogenesis, though uncertainties remain regarding their precise role. The current study investigated the effects of genetic ablation of the microglial *Bmal1* gene on the development of retinal vasculature in mice. *Bmal1* deletion was induced using tamoxifen injections at postnatal day 8.5 (P8.5), and retinal vasculature was examined across the superficial, intermediate, and deep vascular layers after the eye was allowed to develop until P21.5. Quantitative quadrant-level analysis revealed a significant reduction in branching points in the deep layer of the retinal vasculature in mutant eyes compared to the control eyes, with no observed differences in the superficial and intermediate layers. These findings suggest a unique role of *Bmal1* in the development of the deep vascular layer, potentially influenced by the timing of induced conditional knockout. This study contributes to the growing understanding of circadian rhythm gene function in retinal angiogenesis and its potential implications for retinal diseases.

C9 **Enhancing MICP from Bacillus subtilis Through Optimization of Culture Conditions**

M. E. Jennings1, B. Chaudhry2, S. Bonn2;
1 Biology and Earth System Sciences, Wilkes University, Wilkes-Barre, PA, United States,
2 Wilkes University, Wilkes-Barre, PA, United States.

Calcium carbonate (CaCO3) is an inorganic salt found naturally in rocks and minerals, most notably limestone. Commercially, it has been used in plastics, paints, adhesives, as well as to enhance the opacity and whiteness of paper. Sintering is the primary way of producing calcium carbonate for such commercial uses, but results in the release of carbon dioxide into the atmosphere. Microbial induced carbonate precipitation (MICP) is an alternative method of carbonate production that can convert atmospheric CO2 into CaCO3, which reduces CO2 emissions and facilitates the decarbonization of industries. However, the yield of this method is far below what can be achieved via sintering. We have a Bacillus subtilis isolate, P12B, which was collected from a limestone cave environment and utilizes a unique MICP pathway involving extrusion of calcium ions derived from organic calcium salts. A series of culture conditions were set up to determine the optimum conditions for CaCO3 production. Calcification was quantified by harvesting precipitated CaCO3 from culture tubes, dissolving in acid, and then quantifying liberated calcium ions via spectroscopy. Our starting culture conditions used a modified B-4 media with glucose excluded and calcium-succinate as the calcium source (B4mSuc), a 30°C incubation temperature, and harvesting of CaCO3 following two days of incubation. The modifications to those conditions that were tested included source of nitrogen, incubation length, incubation temperature, the addition of trace elements, and calcium substrate concentration. We determined maximum production occurred following a one-week incubation at 37°C, with yeast extract as the nitrogen source. Additional trace elements did not increase production of CaCO3. We also demonstrated that while overall CaCO3 production increased slightly with increased calcium concentration, overall % yield decreased. These data lay the groundwork for testing P12B strains that have been modified to overexpress key proteins thought to be involved in the calcification reaction. Increasing carbonate production to rival the production rate of sintering can lead to a method of producing CaCO3 which actively removes CO2 from the atmosphere rather than contributing to global carbon emissions.

C10 **Neurotoxicity of 2,2',4,4'-tetrabromodiphenyl ether (BDE-47) during embryonic zebrafish development**

Ryann Henry, Reagan Vander Heide, Samantha Faeth, Julia Mullane and Nicole M. Roy, Ph.D.
Sacred Heart University

Polybrominated diphenyl ethers (PBDEs) are added in high volumes to textiles, furniture foams, plastics and electronics as flame retardants. Although these PBDEs are effective in protecting property and human life from fire, their high production volumes have led PBDEs to be pervasive environmental contaminants and pose an ecological risk. Here we investigate the developmental neurotoxicity of 2,2',4,4'-tetrabromodiphenyl ether (BDE-47) using the zebrafish vertebrate model system. We treated zebrafish embryos with control, vehicle, low (5μM) and high concentration (20μM) of BDE-47 at 6 hours post-fertilization before the onset of gastrulation and treated continuously until 6 days. Consistent with others, we find abnormal curvature of the body with flexion of the hindbrain, but studies on neurotoxicity were lacking. Using a transgenic expressing green fluorescent protein in the branchiomotor neurons of the hindbrain, we find a significant decrease in the length of rhombomere 1-8 and loss of the canonical patterning of branchiomotor neurons V-VII in treated embryos. We further investigated oligodendrocytes in the hindbrain using a myelin basic protein transgenic and found a significant decrease in the number of oligodendrocytes in the hindbrain of treated embryos. Given the abnormal curvature of the body, we also investigated muscle myofibrils and primary motor neurons which innervate the trunk musculature. We find that by 6 days, muscle myofibrils are disrupted in a concentration dependent manner, but despite the spinal curvature, the motor neuron pattern along the chevron-shaped somites was not affected. However, BDE-47 treated embryos demonstrated a decrease in motoneuron signal. Here we conclude that BDE-47 is neurotoxic to the developing embryos.

C11 **How does the internal circadian clock affect elite sport performance?**

Amanda Suarez and Ben Collins
Department of Biology, Sacred Heart University

We all have an internal circadian clock that regulates our behavior and physiology. When we suffer from jetlag it is because our internal clock has become desynchronized from our environment. It is well established that some individuals' clocks leads them to be night owls – staying up late and sleeping later in the morning, while others are larks, up early and to bed early every day. As a result, we each have specific times of day where we are likely to be most alert, have the best cognitive function and performance.

Professional Baseball players play 162 games a year spread across different time zones in the US, and it is well established that jetlag negatively impacts overall team performance. With game start times ranging from 12PM EDT to 7:10PM PDT, we wanted to test whether individual players showed differences in performance that might be related to their internal clock preference. We analysed data from the 2024 baseball season, and identified players whose difference in performance between day and night was more than two standard deviations from the mean. We then looked at performance over previous years to determine whether this performance difference was consistent (and likely controlled by our internal clock) or not. The player who showed the biggest consistent difference in performance between day and night was reigning NL VIP Shohei Ohtani, raising the possibility that circadian and sleep-based interventions could boost the performance of even the very best players.

C12 **Investigating a Sleep Gene Network in Drosophila**

Gianni Walsh, Camryn Keegan, Kelsey Jacobsen and Ben Collins
Department of Biology, Sacred Heart University

The time we fall asleep is the result of an interaction between the sleep homeostat (how tired we are) and our internal circadian clock (whether it is the right time to fall asleep). While the molecular and neuronal basis of the circadian clock in Drosophila is extremely well understood, it remains unclear how the clock and homeostat interact within the brain to regulate sleep. A previous study identified a network of genes that are upregulated after sleep deprivation, and preliminary data suggests flies mutant for these genes show altered sleep levels and disrupted sleep timing. To test whether these genes are acting at the homeostat, within the clock, or both we are characterizing 1) the behavior of flies mutant for these genes and 2) what happens when expression levels of these genes are raised or lowered within a subset of clock neurons in the fly brain. Preliminary data suggests that two of these genes, CG6724 (previously uncharacterized) and Syndecan (Sdc, a protein involved in axon guidance) disrupt sleep and affect the neuronal development and structure of the clock neurons. Thus, understanding this gene network will lead to greater knowledge of how the sleep homeostat and clock work together to regulate sleep.

C13 **Optogenetic Manipulation of Clock Neurons**

Lauren Pouliot and Ben Collins
Department of Biology, Sacred Heart University

Drosophila circadian rhythms are arguably the best understood behavior at the molecular level, and we also have a good idea of how different groups of clock neurons work together to regulate daily rhythms of behavior, with the small Lateral Neurons often described as morning cells, promoting wake and activity at dawn, while a subset of dorsal clock neurons, termed evening cells, regulate activity at dusk.

Optogenetics is a method of manipulating individual groups of neurons using specific wavelengths of light that activate ion channels that cause neurons to either 'fire' (turned on) or become silent (switched off). Thus we can precisely alter the activity of small groups of neurons and directly measure the effect on behavior. While this technique has been used extensively throughout the field of neurobiology, it remains relatively underutilized in studying circadian behavior. In this poster we describe the preliminary steps taken in establishing this technique as a tool to look at the role of neuronal communication in Drosophila daily sleep-wake cycles.

C14 **Multipronged Elucidaton of BacM Behavior in M. xanthus**

Gregory Maier, David Zuckerman,
Department of Biology, Iona University.

BacM, a bacterial cytoskeletal protein of the gram-negative soil bacteria Myxococcus xanthus, is a protein necessary for the maintenance of its cell morphology. The absence of the BacM in M. xanthus leads to a crooked morphology of the cell and increased antibiotic sensitivity to antibiotics targeting cell wall biosynthesis. The mechanism of action for BacM's role in cytoskeletal synthesis is unknown. We hypothesized that BacM is directly correlated with the rescue of wild type morphology in M. xanthus. We analyzed the role of BacM concentration on the cell morphology via knockout mutant with a vanillic acid activated inducible promoter plasmid. A preliminary assessment using light microscopy observed a perceived intermediate phenotype in subsequent generations of M. xanthus after the introduction of vanillic acid. A time point was identified where there was an intermediate phenotype with detectable BacM present, and an eventual rescue of wild type morphology. A quantitative analysis of BacM concentration was done via western blot, along with IF staining to determine the location of BacM during the transition from one phenotype to another. The presence of BacM was detected on the western blot at the same time point that the intermediate phenotype was observed. IF microscopy was inconclusive, as the localization within the cell was not clear from the data collected. The results seem to indicate that BacM concentration is tied to cell morphology.

C15 **Does the BacM-L Protein N-terminus Mediate Protein-Protein Interactions at the Cell Membrane?**

Avia Willis and David M. Zuckerman
Iona University, Biology Department

BacM is an important protein for maintaining the proper shape of Myxococcus xanthus cells. It has two isoforms: BacM-L and BacM-S. The N-Terminus of BacM-L has an additional 23 amino acids relative to BacM-S. Mutant cells without bacM have a defective cell wall and crooked shape. When imaged by fluorescent microscopy, BacM-L localizes to the cell periphery. We reason that the additional 23 amino acids in BacM-L mediate protein-protein interactions and membrane localization. To identify possible BacM-L interaction partners, two plasmids were engineered: Control plasmid pDMZ307 contained GST fused to a 6x histidine tag; plasmid pDMZ308 has the same sequence but with the novel BacM-L sequence fused to the N-terminus. These plasmids were transformed into M. xanthus for protein expression. Translated proteins will be extracted using GST beads to isolate and identify interaction partners specific to BacM-L N-Terminus.

C16 **Genetic Characterization of Massospora cicadina:**
Insights into Evolutionary Relationships and Primer Development

Nancy Avalos, Eastern Connecticut State University

This project aims to compare Massospora cicadina samples collected from five locations in Illinois during the 2024 double brood emergence to those from Indiana and West Virginia, as reported in Macias et al. (2020), to elucidate their evolutionary relationships. M. cicadina is an obligate fungal pathogen that infects periodical cicadas, replacing their abdomen with spores and spreading through asexual conidia, while also possessing a dormant, sexually reproducing stage. Macias et al. (2020) sequenced four genetic loci to compare Massospora species, including isolates of M. cicadina from West Virginia and Indiana. We are sequencing the same four loci to compare our Illinois specimens to those from Macias et al. and assess genetic diversity within our samples. Additionally, we designed primers using sequence data from Macias et al. and the NCBI BLAST database to specifically target M. cicadina, improving specificity over general Massospora primers. Despite the limited research on M. cicadina, this study advances understanding of its genetic diversity and reproductive strategies. Our work could provide future researchers with valuable primers for studying M. cicadina, offering a tool to further advance research on its ecology, transmission, and impact on cicada populations.

C17 **The Venom Microbiome: Bacterial Diversity in the Scorpion Species Hadrurus arizonensis**

Brycen Kennedy, Zachary Kelly, Dr. Matthew R. Graham, Dr. Barbara Murdoch
Eastern Connecticut State University

The microbiome consists of the diverse community of microorganisms that inhabit a given environment, including animals, plants, and other organisms. While the microbiomes of many arthropods and arachnids have been studied, the scorpion microbiome remains largely unexplored. Previous research from our lab has identified diverse bacterial communities within the venom-producing organ, the telson, but it remains unclear whether the venom itself contains bacteria. Scorpion venom has traditionally been considered sterile, with no prior evidence suggesting the presence of bacteria. However, bacteria have been detected in the venoms of other organisms, including snakes, spiders, and insects, raising the question of whether scorpion venom might also contain microbial life. Finding preliminary evidence of bacteria in scorpion venom, we conducted a larger study to investigate bacteria within the venom of Hadrurus arizonensis, the giant desert hairy scorpion. We extracted DNA from scorpion venom and used Nanopore 16S rRNA long-read sequencing with downstream Epi2Me bioinformatics to determine the bacterial taxa in the venom. Here we show the diversity of bacteria in the venom of H. arizonensis and comment on its potential function. Microbial associations in venomous organisms could have significant implications in medicine and biotechnology. These findings improve our understanding of the microbiome within venomous structures and highlight the utility of Nanopore sequencing.

C18 **Microbiome Analysis of Scorpion Venom from Anuroctonous phaiodactylus**

Abby Heidorn, Zachary Kelly, Dr. Matthew R. Graham, Dr. Barbara Murdoch
Eastern Connecticut State University

Venom is composed of a complex mixture of compounds with unique biological functions. Interestingly, the venom protein components have shown potential clinical and pharmacological applications in a variety of areas, including the production of anti-cancer and antifungal medications. Despite the wealth of knowledge regarding the venom's protein components, there are no reports of microbiome analyses in the scorpion venom. This may be attributed to the central dogma that scorpion venom is sterile - devoid of bacteria. Contrary to central dogma, preliminary studies in our lab found bacteria in the venom, leading to a larger study discovering the bacterial communities present in the venom of Anuroctonous phaiodactylus, the swollen stinger scorpion. Using Nanopore sequencing, we analyzed venom DNA for amplicons from the 16S rRNA gene. The 16S rRNA gene is commonly used to identify bacteria. Through taxonomic analysis with Epi2Me bioinformatics, we provide important insights into the types of bacteria present. Having sampled our scorpions from different geographical regions, we hope to decipher the possible role of the microbiome in the geographical adaptation of Anuroctonous phaiodactylus.

C19 **Enhancement of Calcium Carbonate Precipitation Through Overexpression of the Specific Genes in Bacillus Subtilis**

Minh Thy Nguyen, Mayerly Perez, Dr. Matthew Jennings,
Department of Biology and Earth Sciences, Wilkes University

Calcium carbonate is an important resource in a variety of industries. Industry methods to produce calcium carbonate release a lot of CO2, which contributes to climate change. Bacteria are known to foment conditions amenable to carbonate formation, including calcium carbonate (MICP), sequestering atmospheric CO2 in stable minerals. Different bacteria utilize different metabolic processes to facilitate MICP, most commonly expression of the enzyme urease. There is an interest in MICP facilitated by bacteria that have been isolated from limestone caves which use a unique MICP pathway involving catabolism of organic calcium salts and excretion of calcium ions, generating a local increase in concentration. We hypothesize that overexpression of two Ca2+ ion transporter genes: chaA and an ATP driven Ca transporter (caatp), will increase the rate of CaCO3 formation over the wildtype strain. Genes from P12B were amplified using PCR and cloned into the plasmid pPB41 for integration into the B. subtilis genome. Pveg promoter was amplified from a plasmid (pVeg) and cloned into pPB41 upstream of the gene to drive constitutive expression. PCR fragments and plasmid backbone were combined using Gibson assembly, and plasmid constructs sequenced to confirm correct construction. Plasmids were used to transform P12B, and integration was screened via PCR. Overexpression of protein was confirmed via SDS-PAGE analysis of whole cell lysate compared to P12B. Transformants and P12B were assayed for MICP by growth in calcification media then quantifying insoluble calcium using the dye Arsenazo III. Results had not been generated at the time of abstract submission.

C20 **The Expression Pattern of Amyloid Precursor Protein in Cultured Chick Forebrain Neurons**

Julianna Koman and Joseph Tenedine, Biology, Sacred Heart University

The amyloid precursor protein (APP) is widely expressed in the central nervous system and evidence suggests it plays a key role in the pathogenesis of Alzheimer's disease. Understanding the normal targeting and processing of the APP protein in neurons will provide insight into the mechanisms that result in the pathophysiology associated with Alzheimer's. We have expressed a FLAG-tagged human APP in cultured embryonic chick forebrain neurons and visualized its distribution using immunocytochemistry and fluorescent microscopy. Preliminary data suggests that the APP protein is expressed in both the somatodendritic (cell body and dendrites) domain and axons of the cultured chick neurons consistent with data in other systems. Live staining of the FLAG-APP construct suggests that cell surface staining is primarily in axons.

C21 **The Expression Pattern of α6 and β4 Integrin Receptor Subunits in Cultured Chick Forebrain Neurons**

Jenna Jacinto and Nadia Gaberkorn, Biology, Sacred Heart University

Previous data suggest that a laminin receptor is localized in the axons of chick forebrain neurons mediating the axon-growth promoting properties of laminin. Many heterodimers from the integrin family of proteins have previously been identified as laminin receptors, including the α6β4 heterodimer. We tested the role of β4, β1, and α6 integrins in laminin-induced increases in axonal growth using function blocking antibodies. Axons of neurons grown on laminin treated with β4 integrin function blocking antibodies or α6 integrin function blocking antibodies were significantly shorter compared to untreated cultures or cultures treated with a β1 integrin function-blocking antibody. These data are consistent with the hypothesis that the α6β4 heterodimer acts as the axonal laminin receptor in embryonic chick forebrain neurons and is important in axonal development and growth. To directly test whether α6 or β4 integrin was localized to axons, we transfected cultured forebrain neurons from embryonic chick with DNA constructs encoding both α6 and β4 integrin genes. Immunostaining was performed to both α6 and β4 integrins and visualized via fluorescent microscopy. Preliminary results show α6 and β4 integrin expression in axons as well as dendrites.

C22 **EVALUATING THE IMMUNE RESPONSE IN MICE FOLLOWING INTRAVENOUS EXPOSURE TO THE ARTIFICIAL OXYGEN CARRIER OXYVITA®**

Alina Mendelowski and James Moran, PhD, Mount St. Mary's College

Hemoglobin Based Oxygen Carriers (HBOCs) may provide a viable substitute for blood in emergencies. These oxygen carriers are like hemoglobin, which carries oxygen around the body. OxyVita is an HBOC composed of polymerized bovine hemoglobin tetramers produced at OXYVITA Inc. in Middletown, NY. This polymer is currently undergoing preclinical testing to determine its safety and efficacy. Previous studies have shown that repeat exposures in the peritoneal cavity (IP) caused a robust antibody response to the OxyVita polymer, which continued to increase after subsequent exposures. Importantly, OxyVita treated mice gained weight at the same rate as the saline control mice, which is a good first indicator of the health of the mice. Our current studies evaluated the antibody response in mice exposed through the intravenous route (IV), which better approximates the intravenous infusions used in emergency medicine. Antibody production was measured through our established ELISA protocol. The results demonstrated that the quantity of circulating antibodies present following IV exposure was similar to that of the IP mice, demonstrating an adaptive immune response. This then led to strong memory responses with subsequent exposures. Future studies will continue to assess the safety of repeated OxyVita exposures through the IV route.

Platform Presentations D
2:30-3:15

D1 **Body Image Importance & Body Dissatisfaction: Unpacking the Difference**

Marlena Bailey, Matt Curtis, Jordyn Dolan
Ithaca College

Body dissatisfaction has been the subject of research for decades, as it is endemic in US culture (Hock et. al, 2024). However, few researchers have investigated the relationship between body image importance (BII) and body dissatisfaction (BD). Body image importance reflects how much someone cares about others' perceptions. It is focused on external image, which includes physical body characteristics and overall appearance (clothing, makeup, etc.). The authors of the current study created a scale to explore this construct using five questions taken from the Grandiose Narcissism Scale (GNS). The study explores the relationship between BII and BD. The relationship between the Body Image Importance Scale (BIIS) and anxiety and depression are also explored, along with the differential associations of BII for men and women. A sample of 782 undergraduate students at a private liberal arts institution completed an anonymous online survey that included the BIIS, subscales of the Eating Disorder Index, the Zung Anxiety Scale, and the Zung Depression Scale. Counterintuitively, results indicated there was no relationship between BII and BD. Similarly, BII was unrelated to a desire for thinness. For men, BII was negatively associated with depression and anxiety (anxiety $r = -.274$, $p < 0.05$, depression $r = -.213$, $p < 0.05$), but this relationship was weak or absent for women. For women, the BIIS was predictive of aggression ($r = .234$, $p < 0.05$). Additionally, further predictors of BIIS scores are explored, and suggestions for future research are discussed.

D2 **The Lasting Impacts of Childhood: How Early Experiences Shape Romantic Relationships**

Liam Murphy, Brooke Willer, Carly Howard, Taylor Rice
Ithaca College

Research has demonstrated a relationship between a person's level of happiness and satisfaction in romantic relationships (Waldinger & Schulz, 2010). Greater relationship satisfaction is correlated with better overall health, as well as a lower risk of mortality. (Robles et al., 2014). The ability to form and maintain romantic relationships may be affected by a person's childhood experiences regarding family structure and trauma. The current study explored the impact of divorce and sibling status on relationship satisfaction as well as early experiences of abuse and neglect. A sample of 782 undergraduate students completed an anonymous online survey that included The Childhood Trauma Questionnaire (CTQ), Relationship Assessment Scale (RAS), and items addressing family structure and siblings. These were embedded in a larger survey. Participants reporting greater childhood trauma were less likely to report being in a current romantic relationship, and there was a negative correlation between CTQ and RAS for those in relationships. Additionally, emotional abuse and neglect were stronger predictors of relationship satisfaction than physical abuse and neglect. It was also found that women with divorced parents were more likely to be in a romantic relationship than women with married parents. This was not true for men. There was no difference in relationship satisfaction between children with divorced parents versus not. Finally, it was determined that those with siblings were no more or less likely to be in relationships and reported no differences in relationship satisfaction. Future research should replicate these findings with a larger and more diverse sample.

D3 **Streamed Stereotypes: Gender Roles in the World of YouTube Kids**

Brienne Banghart and Rami Kayed
Dept. of Psychology, Ithaca College

Extensive research has examined gender portrayals and stereotypes in children's television (Signorielli, 1990; Witt, 2012), yet digital streaming platforms remain understudied. While YouTube Kids was designed to provide a secure, age-appropriate environment, research suggests that inappropriate and gender-stereotyped content still reaches young audiences, raising concerns about the platform's effectiveness (Sarwar et al., 2023). This study analyzes gendered messaging in recommended YouTube Kids videos from October to December 2024, focusing on content targeting children aged 5–8 or 9–12. The sample consisted of 96 videos, each 15 minutes or shorter, including 28 shorts and 68 homemade videos. Pairs of trained coders from the CRETV lab in Ithaca College's Department of Psychology coded for content type, character representation, gender stereotypes, misbehavior, and the presence of music, visual, and sound effects. The videos frequently featured humor, skits, and family-oriented content, with most incorporating music and special effects. A total of 681 characters were coded: 32% were live human characters, while 50% were animated figures. Male characters appeared more frequently than females, with males more often portrayed as adults and females as children. More than 35% of the videos portrayed explicit gender stereotypes, such as color-coded gender norms (e.g., pink for girls, blue for boys). Nearly half featured misbehavior, with boys engaging in it more frequently than girls. Differences in content by target age group will also be reported, with findings discussed in relation to their potential influence on children's perceptions of gender roles.

Poster Session E
3:00-4:30

E1 **The Effect of Heat & Physical Scarification on the germination of Gymnocladus dioicus (Kentucky coffeetree)**

Chidera Aligwara and Dr. Bryan Connolly
Biology Department, Eastern Connecticut State University, Willimantic, CT 06226

Gymnocladus dioicus, or Kentucky coffee tree is a native species to North America that is currently known to be dispersed only by water. In the past the seeds of this species were likely dispersed by megafauna e.g. wooly mammoths. It is now described as an "ecological anachronism", meaning that it is outside of or ill-fitting for its time period. The tree is not common in the wild and locally endangered in some states. The seeds of this species are very hard and appear to have co-evolved with these now extinct large mammals; in the past they were likely eaten, and the animal's teeth and digestive acids scarified or removed the seed coats allowing for germination. Currently to grow the seed they are filed or placed in strong acid for scarification. We hypothesized that directed heat could be a third method that could allow seed germination. Here we compared mechanical and heat-based scarification treatments to germinate the Kentucky coffee tree seeds. There were three treatment groups for the Gymnocladus dioicus seeds and a control group. Our treatment groups consisted of seeds burned at the chalazal end with a Bunsen burner, another treated with a culinary butane torch, and a third with a metal file. Each experimental group consisted of 20 replicates with 3 seeds each for a total of 60 seeds per treatment and 240 seeds overall. There was no germination in the control group, while 6 germinated in the butane treatment group, and 18 germinated in the file group. Trials are still underway, but it appears the directed heat method of using the culinary butane torch is effective at seed scarification allowing germination. When the trials are concluded the data will be analyzed using an ANOVA. Filing the seed is a tedious and time-consuming process, while the directed heat methods are quicker and much less difficult. We hope these new methods allow more Kentucky coffee trees to be planted and that this will aid in their conservation.

E2 **Melatonin Inhibits Circumnutation in Arabidopsis thaliana**

Samara Durgadin, Eric Brenner PhD, Department of Biology, Pace University

Melatonin (N-acetyl-5-methoxytryptamine) and auxin (indole-3-acetic acid/IAA) are both tryptophan-derived hormones found in Arabidopsis thaliana, the model plant for research (Meinke et al., 1998). Auxin transport and responses regulate circumnutation, a helical organ movement influenced by many variables such as light and chemicals (Stolarz, 2009); studying circumnutation allows researchers to better understand how and why plants have autonomous, endogenous movements without apparent stimuli (Stolarz, 2009). Melatonin in animals is correlated with circadian rhythms (Lewy et al., 1992); circumnutation in plants is also correlated with circadian rhythms (Niinuma et al., 2005). Melatonin negatively regulates auxin biosynthesis, the expression of PIN proteins (protein family of auxin transporters), and auxin responses in Arabidopsis (Wang et al., 2016). Melatonin and auxin are thought to act through different pathways to alter gene expression, with melatonin affecting 16 auxin-related genes (Zia et al., 2019).

No study has been published solely regarding melatonin's role in circumnutation, even though melatonin is involved with auxin biosynthesis and transport, which in turn can affect circumnutation. This study aims to test melatonin's effects on circumnutation in Arabidopsis due to melatonin's role in negatively regulating auxin biosynthesis and transport. Arabidopsis plants were sprayed with 400 μM of melatonin in water with tween-20, then video time-lapses of plants treated with melatonin were compared to a control of water and tween-20. MT-treated Arabidopsis plants had 24.33 fewer mutations than WT Arabidopsis on average. Preliminary results indicate melatonin is inhibitory to circumnutation in Arabidopsis thaliana, given the decrease in back-and-forth (XY-axis) mutations.

E3 **The Effect of Electrical Stimulation on Circumnutation of Arabidopsis thaliana Shoots**

Jazmin Contreras , Eric Brenner (Mentor)
Pace University

Circumnutation is a plant movement exhibited by rhythmic swaying patterns in plant appendages. This study examines the circumnutation patterns observed in Arabidopsis thaliana shoots in response to electrical stimulation at 2V, 5V, 10V, 15V, 20V, and 25V. Time-lapse cameras were used to capture the movement for further analysis through tracking software for detailed motion analysis to assess whether increasing degrees of electrical stimulation altered the amplitude and frequency of circumnutation.
Prior studies have established that circumnutation in Arabidopsis thaliana is influenced by gravitropism and auxin transport, with Arabidopsis thaliana displaying altered movement patterns under different environmental cues (Kitazawa et al., 2005). Auxin signaling, specifically mediated by AUX/LAX influx transporters (Péret et al., 2012), is crucial in regulating growth-related movement patterns. The findings suggest that external electrical stimulation delivered may interact with these mechanisms, by possibly altering ion channel activity and auxin distribution. Results indicate that increasing electrical stimuli negatively influences the rhythmic swaying patterns in Arabidopsis thaliana shoots. These findings can potentially be a starting point for further exploration of the relationship between internal electrical signaling and circumnutation.

E4 **Assessing the effects of spatial and temporal variation in sediment conditioning on seagrass seed germination and seedling performance**

Mason J. Tsaglos1, Forest R. Schenck2, and Torrance C. Hanley1

1Sacred Heart University, Department of Biology, Fairfield, CT

2Massachusetts Division of Marine Fisheries, Salem, MA

Seagrass meadows provide numerous ecosystem functions and services, making conservation and restoration of these ecologically-valuable systems a high priority for coastal managers. The global decline of seagrass meadows necessitates finding consistently effective restoration methods. Recently, there has been increased interest in seed-based methods of seagrass restoration. However, these methods have had mixed success, with highly variable outcomes. Relatively little is known about how sediment characteristics, including soil conditioning by seagrasses at different spatial and temporal scales, may affect seed germination and seedling success in a restoration context. To examine the effects of seed source and sediment characteristics, we conducted a laboratory experiment using eelgrass seeds collected from different source meadows and comparing i) sediment collected different distances from a natural meadow (0, 1, 25, and 250 m from the edge) and ii) sediment that varied in historical seagrass presence (seagrass present currently and seagrass present ~1, 5, 10, and 20 years ago). We measured seed germination and seedling performance, and also assessed seed quality and viability. Our results can be used to inform seagrass restoration in New England, suggesting that i) sourcing seeds from multiple meadows will increase the likelihood of including higher quality seeds, and ii) including sediment inoculations from vegetated sites may increase success.

E5 **Assessing patterns of parasites in Long Island Sound horseshoe crabs**

Megan Prettyman, Robert Bevilacqua, Jo-Marie Kasinak M.S.
Sacred Heart University, 5151 Park Ave, Fairfield CT, 06825

The American horseshoe crab, Limulus polyphemus, plays an important role in both biomedical and ecological fields. Their blood is used to make Limulus amebocyte lysate (LAL), because it clots on contact with bacteria and other pathogens. Because of this, they are harvested and bled so that this compound can be used in the pharmaceutical industry to test vaccines, medical devices, and other products for contamination. Ecologically, horseshoe crab eggs serve as an important food source to migratory shorebirds, such as the Red Knot, during their migration. Limulus can be found along the east coast of North America and the population is stable in many areas, however, it is declining in the Long Island Sound (LIS). A parasite has previously been identified, Bdelloura candida, which lives and lays eggs in the organism's gills. This study sought observe comparisons of parasite load in LIS horseshoe crabs. Through Project Limulus horseshoe crabs were tagged and released all over the coast of Connecticut. Data was collected on Limulus between May 2024 and mid-July 2024 including sex, size, location, shell condition (scale of 1-3), and parasite load (scale of 0-4). Analysis of the data is ongoing and will be assessed to identify trends between parasite load and other factors. This analysis will be relevant in learning more about the parasite and how it may affect the horseshoe crab's population, including important conservation implications.

E6 **Comparing oyster condition and prevalence/intensity of oyster macroparasites between aquaculture grow-out methods**

Amanda J. Smentkowski1, Loretta A. Fernandez2, Jonathan H. Grabowski2, A. Randall Hughes2, David L. Kimbro2, Olivia A. Griffin1, and Torrance C. Hanley1
1 Sacred Heart University, Department of Biology, Fairfield, CT
2 Northeastern University, Department of Marine and Environmental Sciences, Nahant, MA

Oyster aquaculture provides numerous ecosystem functions and services and is an economically-valuable component of seafood production in the United States. However, parasite exposure and infection can impact the short- and long-term sustainability of oyster aquaculture. Aquaculture practitioners use multiple farming techniques, such as on-bottom cages and floating bags, to optimize oyster condition and marketability. These different methods expose oysters to a variety of micro-and macro-parasite species that can independently and interactively affect oyster health, but the relationship between grow-out methods and single and multiple parasite infections - and the consequent effects on oyster condition - require further study. Here, we compared condition of oysters grown on-bottom vs floating at four aquaculture sites in Massachusetts, and measured prevalence and intensity of multiple common macroparasites (boring sponge and mud blister worm) from July to December in 2023 and 2024. We found that oysters grown in on-bottom cages had consistently worse condition than oysters grown in floating bags, though the magnitude of these differences varied across aquacultures sites. Similarly, macroparasite prevalence and intensity varied across site x depth combinations. Our findings can be used to inform aquaculture practice in New England, specifically how parasite exposure depends on farming methods and the consequences for oyster condition and marketability.

E7 **Investigating the biological mechanism underlying Varroa destructor mite resistance in a Swedish population of Honeybees (Apis melifera)**

Benedetto Galluzzo1, Justin Hillis1, Alyssa Woronik1, Barbara Locke Grander2
1 Sacred Heart University, Fairfield, CT, USA
2 Swedish University of Agricultural Sciences

Pollinator species play an integral role in plant reproduction. Therefore, it is difficult to overstate the importance of pollinators for agricultural and ecological systems. Currently it is estimated that approximately 90% of flowering species, including crop species, rely on animal pollination. Overall, bees are the most dominant taxonomic group amongst pollinators, of which the honeybees are arguably the most important taxa. The ectoparasitic mite, Varroa destructor, is the largest threat to honeybee health and sustainability worldwide. The mites vector viruses to the colony and ultimately that develops into a lethal epidemic for the colony and causes collapse. There are currently two strategies for controlling mite populations within domestic honeybee colonies: chemical insecticides to remove mites and selective breeding for bee behaviors that infer a level of mite resistance to reduce mite infestation. Unfortunately, neither of these practices are sustainable as long-term solutions to the mite problem. However, globally there are several wild honeybee populations that have survived mite infestation for long periods of time without mite management. These populations may represent sustainable co-adaptation between mites and honeybees and investigating the host-parasite adaptations in these populations may lead to answers regarding how honeybees and mites can maintain a stable interaction. One such resistant population was identified on the Swedish Island of Gotland. In this work we aim to investigate the biological mechanism responsible for this resistance.

E8 **Comparing the effects of elevated temperatures on flowering of a foundation species in natural versus restored marshes**

Emma M. Murphy1, Sarah C. Crosby2, and Torrance C. Hanley1
1 Sacred Heart University, Department of Biology, Fairfield, CT
2 The Maritime Aquarium, Norwalk, CT

Globally, many plants are experiencing elevated temperatures as a result of climate change, which can affect survival, growth, and reproduction and have far-reaching impacts on populations and communities, particularly in plant-dominated ecosystems. In addition, these effects may vary depending on whether a system is composed mainly of a natural population that has existed for decades with minimal human interference versus a restored population that has been created or modified by human activity. Here, we focus on the effects of ambient versus elevated temperatures on the reproduction of Spartina alterniflora, a foundation species in natural versus restored salt marshes, to predict the effects of climate change on a key component of population dynamics – flower production and seed germination. We conducted a field mesocosm experiment exposing Spartina in 3-4 natural versus 3-4 restored marshes to ambient and elevated temperatures during the 2023 and 2024 growing seasons, collecting flowers in the fall of each year to compare flower quality and seed germination of Spartina. We found differences in flower quality (i.e., length and weight) depending on marsh status and temperature treatment, with larger flowers from restored versus natural marshes and larger flowers from ambient versus warmed treatments. In addition, seed germination rate varied depending on marsh status and temperature treatment. These results have important implications for salt marsh resilience under climate change, as Spartina reproduction is critical for maintaining genetic diversity and adaptive potential of populations of this foundation species.

E9 **Determining how oyster health and parasite prevalence differ between aquaculture grow-out methods**

Olivia A. Griffin 1, Loretta A. Fernandez 2, Jonathan H. Grabowski 2, A. Randall Hughes 2, David L. Kimbro 2, Amanda J. Smentkowski 1, and Torrance C. Hanley 1
1 Sacred Heart University, Department of Biology, Fairfield, CT
2 Northeastern University, Department of Marine and Environmental Sciences, Nahant, MA

Oyster aquaculture provides a variety of valuable ecosystem services and is a critical component of sustainable seafood production in the United States. However, a number of stressors, such as pollutants and parasites, hamper the sustainability of oyster aquaculture. Oyster aquaculture uses multiple farming techniques, such as on-bottom cages and floating bags, to optimize oyster survival, growth, condition, and marketability. These different methods expose oysters to a variety of abiotic and biotic factors that can independently and interactively affect oyster health metrics. In particular, the relationship between grow-out methods and parasite exposure, and the consequent effects on oyster survival and growth, merit further investigation. Here, we compared survival and growth of oysters grown on-bottom vs floating at four aquaculture sites in Massachusetts, and measured parasite prevalence from July to December in 2023 and 2024. We found that oysters grown in on-bottom cages had consistently lower survival, decreased growth, and worse condition than oysters grown in floating bags, though the magnitude of these differences varied across aquacultures sites. Similarly, microparasite prevalence varied across site x depth combinations. Our findings can be used to inform aquaculture in New England, specifically how variation in parasite prevalence can affect oyster survival, growth, and marketability.

E10 **Exploring the effects of biocide exposure on non-target organisms: How glyphosate and imidacloprid affect Daphnia vital rates**

Logan Granger and Torrance C. Hanley
Sacred Heart University, Department of Biology, Fairfield, CT

The use of herbicides and pesticides is ubiquitous in the United States, yet the effects that exposure to these biocides has on non-target organisms, particularly in aquatic systems, remains under-emphasized. The unintended consequences of single and concomitant biocide exposures could include changes in vital rates (survival, growth, reproduction), as well as behavioral, morphological, or physiological characteristics. Daphnia is a key species in most lakes and ponds, consuming phytoplankton and regulating algal densities while also being a valuable prey for planktivorous fish. We tested the independent and combined effects of two common biocides (the pesticide Imidacloprid and the herbicide Glyphosate) on two common species, Daphnia magna and Daphnia pulex. We included a range of three Imidacloprid (1.83-8.70 mg/L) and three Glyphosate (7-56 mg/L) concentrations, and exposed Daphnia to each biocide independently, as well as combination treatments of low, medium, and high concentrations, with the goal of including treatments and combined exposures that reflected typical levels in lakes/ponds. We identified differences in survival, growth, and reproduction across our treatment combinations that illustrate the potential impacts of unintended biocide exposure on this key aquatic species.

E11 **Risk Aversion and Food Preference in Hissing Cockroaches**

Isabella Symington-St. John, Amber Craney
Eastern Connecticut State University

Abstract: Due to the social relationships of cockroaches, we hypothesized that the Madagascar hissing cockroach, Gromphadorhina portentosa, would be capable of detecting conspecific chemical cues associated with fear and that the presence of those cues might influence foraging behaviors. To test this hypothesis, we obtained disturbance cues from a hissing cockroach by agitating it and then collecting those compounds in a water rinse. In an initial study, when given a choice between food treated with disturbance cues or untreated cues, G. portentosa preferred food without disturbance cues. In a second study, roaches were given the choice between low- and high-quality foods, half of which were treated with disturbance cues. In this study, patterns regarding food preference in relation to conspecific disturbance cues were less clear. Although abundant research has been conducted on the behavior of German cockroaches, less work has examined the foraging and risk avoidance behaviors of Madagascar hissing cockroaches. This study is an important contribution to a better understanding of predator avoidance and food preference in that species.

E12 **The role of habitat complexity in ladybird beetle functional responses**

Arya Alla, Department of Biology, Sacred Heart University.
Kyle Maggio, Department of Biology, Sacred Heart University.
Alexa Matkiwsky, Department of Biology, Sacred Heart University.
Dr. James Loving Lichtenstein, Department of Biology, Sacred Heart University.

Ecology spends a lot of time using predator density to predict prey survival. However, most ecological models ignore the role of interactions among individual predators in this process and how these interactions depend on the complexity of the environment. For example, more complex environments might give predators more places to hide and avoid each other, decreasing bullying. We therefore tested whether habitat complexity decreases interactions among predators, increasing how well their solitary foraging behavior predicts their foraging at different densities. We measured how many moth eggs (Ephestia kuehnielia) ladybugs (Hippodramia convergens) ate alone in small simple arenas. Next, we measured how many moth eggs they ate in pairs in differently sized arenas (predator). We also measured the size of the ladybugs monitoring any changes. We are currently analyzing how habitat complexity affects the ability of the individual foraging performance to predict their foraging at these different levels of predator density. This poster will go over these results and explain how they can be used to refine ecological models.

E13 **Role of environmental conditions in determining plant size differences in restored and natural Spartina alterniflora**

Allegra Simon, Department of Biology, Sacred Heart University

Sediment composition plays a crucial role in plant growth, nutrient availability, water retention, and soil stability, factors that often differ between restored and natural salt marshes. Understanding these differences is essential for wetland restoration and environmental management. This study investigated how differences in physical conditions at a restored and a natural marsh in Connecticut impact smooth cordgrass (Spartina alterniflora) growth. We measured S. alterniflora height at each site and estimated energy at each site via plaster erosion in the field. Plants and sediment were collected from Milford Point (natural) and Stratford Point (restored) and grown in a common-garden greenhouse experiment with plants from each site grown in sediment from each site. Plant height was monitored weekly over a ten-week period, and we compared grain size of sediment from each site. In both the field and greenhouse measurements, plants from Milford were taller than plants from Stratford. Milford sediment was finer-grained than Stratford sediment, and Stratford experienced higher rates of plaster erosion than Milford, indicating more stressful conditions at Stratford than Milford. We saw no effects of sediment source on plant growth in the greenhouse, suggesting that wave energy and plant lineage are more important than sediment grain size in determining plant height. Although previous experiments suggested that environmental conditions, not differences in plant genetics, drive the observed plant size differences, these results emphasize the importance of understanding both site conditions and plant genetics when planning for and evaluating marsh restoration.

E14 **Building Resilience in Long Island Sound Marshes: Warming Impacts on Northern and Southern Spartina alterniflora**

Christopher Isaac and Dr. LaTina Steele, Biology Department, Sacred Heart University

Coastal marshes are key in reducing erosion, mitigating climate impacts, and sequestering carbon, but they are in decline globally due to multiple stressors, making them a key target for restoration. This study explored methods to improve the resilience of Spartina alterniflora restoration by comparing plants sourced from northern and southern nurseries under warmed conditions. A field experiment examined differences in flowering, shoot density, and plant height among plant sources (northern, mixed, southern) and warming conditions (control, structure control, warmed) at the beginning, middle, and end of the growing season. Northern and mixed source plants flowered more than southern plants. Northern populations produced a higher number of shoots compared to the other sources across all time points. Southern plants were taller than northern plants at the beginning of the growing season, but northern plants surpassed southern plants in height at the end of the growing season. Although flowering, density, and height varied among plant sources, warming treatments showed no significant effects on any of the parameters measured. Together, these results show that northern source plants are better adapted for a northern restoration site than southern source plants and highlight that selecting appropriate source material is key for effective marsh restoration. Although we found no significant effects of warming, it should be noted that our site experiences higher energy than other restoration locations in Connecticut. Therefore, studying the effects of warming at sites with varying physical conditions is necessary.

E15 **Do differences in body size affect the scaling of ladybird beetle functional responses**

Alexa Matkiwsky, Kyle Maggio, Arya Alla, Department of Biology, Sacred Heart University

How predator density predicts how much prey they eat is a huge concern for ecology. Interactions among individual predators can affect how this works. For example, larger predators might attack smaller predators, decreasing how much the whole population eats. Size differences among predators might change how individuals forage, causing individual foraging behavior to not predict foraging behavior at higher densities. To test this, I counted how many Ephestia kuehniella moth eggs Hippodamia convergens ladybugs ate in petri dishes alone and whether their size affected this. Then I compared this to how many eggs these predators ate in pairs. This allowed me to measure how much differences in their size caused them to eat less. My lab and I are still analyzing the data. My poster will display these results and explain how they might be used to better predict the foraging of predator populations.

E16 **Nutrient Enrichment Alters Resource Allocation to Chemical Defenses in Invasive and Native Aquatic Plants**

Paul Sampino, Department of Biology, Sacred Heart University

Eutrophication may alter plant allocation to chemical defenses, affecting interactions with herbivores and invasive species dynamics. We explored the effects of eutrophication on growth and chemical defenses in native and invasive aquatic plants, hypothesizing that plants would shift resources away from chemical defenses under nutrient enrichment and that grazers would consume more nutrient-enriched than unenriched tissue. We grew fragments of each species under ambient and enriched nutrient conditions in the lab for two weeks and measured their growth, phenolics, and condensed tannin content. Growth was similar across species and nutrient status. Both native and invasive plants relaxed their chemical defense production under nutrient enrichment, although the plants differed in their levels of phenolics and condensed tannins. Invasive Myriophyllum spicatum had higher phenolic levels and lower condensed tannin levels than native Ceratophyllum demersum under ambient nutrients. Nutrient enrichment reduced phenolic levels in M. spicatum and reduced condensed tannin levels in C. demersum. A no-choice feeding experiment with amphipods showed similar grazing on both plants, regardless of nutrient enrichment. These results show that both invasive M. spicatum and native C. demersum may relax their chemical defenses in eutrophic conditions, but effects on herbivory and invasion dynamics remain uncertain.

E17 **Hot heads and hitchhikers: Brain gene expression as a function of simulated heat waves and ectoparasites in nestling tree swallows**

Cassandra Vallon, Vitalina Pivtorak, Alexandria Lovasi, Megan Murphy, Mary Woodruff, Kimberly Rosvall, Emily J Levy, Sacred Heart University

Climate change threatens species that cannot adapt to increasing temperatures. Understanding the physiological responses of endotherms to heat can help predict how species will fare in the face of global warming. However, we know relatively little about the physiological response to heat in endotherms, particularly in the brain. This study tests the impact of simulated heat waves on brain gene expression in tree swallow nestlings (Tachycineta bicolor). Tree swallows are altricial, endothermic songbirds common across a wide range of latitudes. We hypothesize that, within the hippocampus, a simulated heat wave will activate the immune system and self-maintenance mechanisms, increasing the expression of genes involved in these processes. Further, as ectoparasites can tax the immune system, we hypothesize that ectoparasite presence will correlate with higher expression of immune response genes. When nestlings were 12 days old, nest temperatures were experimentally increased by 4.4°C for 4 hours. After the trial, we extracted the hippocampi and measured the expression of genes associated with immune system activation and self-maintenance: pro-inflammatory cytokines (TNFa and IL1b), a cytokine receptor (IL6R), a heat shock protein (HSP90AA1), and a glucocorticoid receptor (NR3C1). Preliminary analyses suggest that the heat treatment did not affect gene expression, but that parasite presence was somewhat correlated with HSP expression. We also found strong, positive correlations among all genes of interest, indicating these genes are co-regulated. Better understanding the neurophysiological response to heat can inform us on the adaptability of endotherms in the face of climate change, with potential application to conservation efforts.

E18 **Mechanisms of Lymphocyte Accumulation in Pulmonary Alveolar Proteinosis**

Ethan Crowley, John Carroll University, Cincinnati Children's Hospital Medical Center, Cincinnati, OH

This study aimed to build upon the prior body of research investigating pulmonary alveolar proteinosis (PAP), a syndrome characterized by lymphocytosis and the overaccumulation of surfactant; specifically, the unknown mechanism by which dysfunctional macrophages drive increased pulmonary lymphocytosis. In PAP, incomplete macrophage differentiation due to granulocyte-macrophage colony-stimulating factor (GM-CSF) signaling deficiency results in increased commitment of multipotent progenitors to an alternative lymphoid lineage cell fate. In addition, abnormally differentiated alveolar macrophages exhibit increased secretion of lymphokines, leading to pulmonary lymphocyte recruitment. Because graded levels of transcription factor PU.1 influence the cell fate choice between B-cell and macrophage development, low levels of PU.1 in the absence of GM-CSF signaling can skew the lineage cell fate choice to lymphoid lineage in progenitor cells, resulting in increased lymphocytes in PAP. An initial investigation conducted by Dr. Trapnell's research group at the University of Cincinnati Medical Center's Pulmonary Translational Science Center revealed that GM-CSF deficient mice had elevated levels of B220+ cells relative to wild-type, substantiating the evidence that lymphocytosis occurs alongside the overaccumulation of surfactant, most prominently associated with PAP. The present study identifies two mechanisms by which the absence of GM-CSF signaling could lead to pulmonary lymphocyte accumulation: first, the presence of elevated upstream and downstream transcription factors in GM-CSF deficient mice, which bias the myeloid-lymphoid lineage commitment decision, promoting lymphoid development over myeloid development; and second, the increased secretion of lymphokines (CXCL 9 and CXCL 16) by immature alveolar macrophages, which in turn recruit larger amounts of lymphocytes to the lungs.

E19 **Investigating the role of deregulated miR-654 and miR-4454 in melanoma pathogenesis and progress**

Farah Mahmood, Dina Giliberti, Dylan Espana, Samantha Bergamotto, Sankhiros Babapoor, PhD.
Sacred Heart University

MicroRNA (miRNA)s are non-coding small RNAs, which can regulate gene expression in animals and plants. miRNAs associated with invasive and aggressive melanoma phenotypes and their role in the invasion and migration of malignant melanoma cell lines Sk-Mel-26 and A375P were investigated. Our previous studies showed that miR-4454 acts as a tumor suppressor in A375P cells through invasion and migration of assay as replicated in our study of Sk-Mel-26 cell line. Cells were transfected with miR-654 or miR-4454, a control scrambled sequence, and miR-654 or miR-4454 inhibitor. Results were compared against well transfected with a scrambled sequence. Migration rate increased after transfection of A-375P and Sk-Mel-26 cells 48h post scratch (P-value= 0.01 and P-value= 0.018 accordingly). miR-654 decreased the migration rate after 24h and 48h (p-value=0.00019). miR-4454 acts as an oncomir, and miR-654 can be considered a tumor suppressor. Further analysis using qRT-PCR will explore miRNA expressions in different cell lines.

E20 **You are what you eat:**
Integrative effects of food supplementation on native and invasive backyard birds

Alexandria Lovasi, Lena Seerosh, Cassandra Vallon, Vita Pivtorak, Emily J Levy
Sacred Heart University

Environmental factors during an organism's early life can cause dramatic long-term effects. While these early-life effects have long been documented, we lack an integrative and comparative understanding how early-life environments get 'under the skin' to affect traits like behavior, morphology, physiology, fitness. Food availability is a particularly interesting early-life factor because all organisms must allocate energy toward the body's many developing systems, and limited energy results in developmental trade-offs. To assess the trade-offs associated with food availability, my research group will conduct a comparative field experiment in native versus invasive birds that tests the effects of food supplementation on nestling behavior, growth, physiology, and survival. We hypothesize that both native and invasive species will experience a release from energy constraints when supplemented with extra food, as evidenced by gains in all traits (detailed below). We also hypothesize that invasive species will benefit more from food supplementation compared to native species, indicative of the success of invasive species across diverse and changing habitats. To test these hypotheses, we will establish control and food-supplemented nests of wild Eastern bluebirds (Sialia sialis) and house sparrows (Passer domesticus). Supplemented nests will receive mealworms throughout nestling development. We will collect data on nestling behavior, breathing rate, growth, immune function, metabolism, oxidative stress, and survival to compile an integrative understanding of the effects of food supplementation across species. Integrative and comparative experiments of wild animals will advance our understanding of the wide-ranging phenotypes affected by food availability, and how evolution has shaped these responses across species.

E21 **An Analysis of Gibbon Call Phrases in hybrids and their parent species**

Kayla Tracy, Hailey White and Thomas Terleph*
* Faculty Mentor
Sacred Heart University

Gibbons are small Asian apes that live in stable territories and produce loud, species-specific songs, often in coordinated male/female duets. Two closely related species with conspicuously different songs are white-handed (Hylobates lar) and pileated gibbons (Hylobates pileatus). In Khao Yai National Park, Thailand, there is a small contact zone of co-occurrence where the species sometimes hybridize. One song phrase produced by hybrid females differs from that of both parent species, but no other hybrid singing has been systematically analyzed, and analysis of male hybrid song has never been reported. Here we describe how male trills, song phrases containing short, rapidly delivered notes, differ between species and show an intermediate number of notes and note rate in hybrid animals. If gibbon vocalizations act as a reproductive isolating mechanism between species, then the intermediate song characteristics of hybrids may be less attractive to potential mates of either parent species and thus potentially account for the small number of hybrid individuals (6-8%) found in the area where both species overlap.

E22 **Is it Raining Over the Hill:**
Hydraulic Analysis of Three River Basins on Ireland's Dingle Peninsula

Mira C. Poelzer
Sacred Heart University

With climate change accelerating and the correlated increase in the frequency of extreme weather events, human infrastructure has become increasingly vulnerable to damage from flooding. Hydraulic analysis of precipitation and river level in three conjoined river basins on the Dingle Peninsula of Ireland allows us to examine variation in response of river basins to precipitation in relation to land-use and land cover (LULC) and other variables. Each of the river basins has differing LULC, which may contribute to differing patterns of water level response following heavy precipitation. We have collected more than 115,000 precipitation and river depth data points for each river basin. Utilizing Tableau and Python scripts to manipulate and visualize the dataset, we are attempting to draw correlations regarding the impact of human development on flood risks in these environments. Analysis of the data shows significant differences in precipitation between the three basins with the Milltown Basin experiencing the most, followed by the Feohanagh and then the Owenmore. To continue our analysis, we have isolated the most significant periods of heavy rainfall to identify "spike events" representing precipitation extremes for further analysis and correlation of LULC to changes in river level in response to extreme weather in the distinctive environments of coastal southwest Ireland.

E23 **The Snow Footprint: Anthropogenic Disturbances Shaping PFAS Concentrations**

Julian Champlin, Ithaca College

There are forever chemicals in the snow, even in the most remote regions (Zhou et al. 2024). This is cause for emerging concern because snow can act a reservoir for PFAS chemicals, that are readily redistributed into the ecosystem (Zhou et al. 2024). Mount Everest has evidence of three different forever chemicals in its snow, streams, and glaciers (Miner et al. 2021). These issues are not specific to the region; forever chemicals are also found locally in the Finger Lakes region of New York. PFAS data for snowfall in Tompkins County are lacking. There is evidence of tires leaching precursors to forever chemicals, but there is a lack of information on how different disturbances to the snow affect PFAS content (Zhang et al. 2023). Tire wear particles (TWP) and PFAS can co-occur in the environment, designating importance to analyze for both in this study. This is vital information for the city of Ithaca as well as Ithaca College as it could have an impact on how we deal with snow on the roads and walkways. In this study, I took snow samples from the natural lands, near the chapel pond, and in a snowbank near a dormitory on Ithaca College's campus with three disturbance types. Samples were also processed for TWP in order to get more information and possible sources for differences in forever chemical concentrations. TWP were imaged and counted by hand, while PFAS were sent to a certified laboratory. Results for TWP and PFAS analysis are discussed.

E24 **Artificial Turf Leachate and Tire Wear Particle Exposure to Daphnia magna: Uncovering the Risks to Aquatic Life**

Bridget Altland, Amelia Meneses, Amonette Sellers, Dr Susan Allen, Department of Environmental Science, Ithaca College

Artificial turf has become increasingly prevalent in sports facilities, presenting potential environmental challenges that warrant thorough scientific investigation. This study aims to evaluate the potential ecological impacts of tire wear particles and artificial turf leachate. We used Daphnia magna, a key organism in aquatic toxicology research (Braumann et al., 2024). Preliminary research suggests that artificial turf, despite its marketed environmental benefits, may pose significant ecological risks through the degradation of tire crumbs, a main ingredient in artificial turf. This recycled rubber can release contaminants that may adversely affect aquatic organisms (Harper, 2025). Using Daphnia magna as a bioindicator, we assessed these chemical mixtures' acute toxicological responses. We used direct visual observations and Ethovision, behavior tracking software, to assess mobility. Daphnia exposed to 7 or 14-day leachate, exhibited less mobility than those not exposed to leachate, 20 out of 78 exhibited decreased mobility after exposure to leachate. When daphnia were exposed to tire wear particles 12 out of 30 daphnia were immobile after 48 hours exposure. Decreased mobility increases the risk of predation on daphnia, which can lead to a decrease in natural daphnia populations. Leading to problems within the ecosystem. Since daphnia acts as bioindicators, other species are likely to be affected as well. As this study only looks at the short-term effects, future research should consider the long-term effects of artificial turf leachate and tire wear particles on aquatic ecosystems.

Index of Attendees

Carly Howard	D2
Aesiah Jeremiah	A11
Rami Kayed	D3
Joshua Kirtley	
Amelia Meneses	B5 E24
Liam Murphy	D2
Taylor Rice	

John Carroll University

Helen Murphy	
Cyrilla Wideman	
Ethan Crowley	E18
Andrew Fullone	A7
Moe Ghanem	A12
Wilson Ha	A10
Adriane Lawes	A20
Veronica Mekhel	A13
Sandy Messiha	C8

Manhattan University

Bryan Wilkins	A17 A21
Lina Amraoui	A17
Joseph Campolo	B3
Hanna Farzin	A21
Jasmin Roman	A21

Mount St. Mary's College

Lynn Maelia	A22
Aleksandra Belugin	A22
Alina Mendelowski	B4 C22

The New York Botanical Garden

Lance Evans	

Pace University

Samantha Beers	
Jazmin Contreras	E3
Samara Durgadin	E2
Ellen Haverstick	A15
James Hill	C6

Sacred Heart University

Kirk Bartholomew	
Ben Collins	C11 C12 C13
Sue Deschenes	
Torrance Hanley	E4 E6 E8 E9 E10
Mark Jareb	
Jo-Marie Kasinak	
Emily Levy	E17
James Lichtenstein	E12 E15
Sarah Poniros	A2 A3
Nicole Roy	C10
LaTina Steele	E14
Ashley Stoehr	
Tom Terleph	E21
Alyssa Woronik	
Arya Alla	E12 E15
Samantha R. Bergamotto	E19
Alexander Besnillian	C7
Robert Bevilacqua	E5
Isabella Bollini	A3
Dylan M. Espana	E19
Mahmood, Farah Crespo	E19
Nadia Gaberkorn	C21
Benedetto Galluzo	E7
Dina M. Giliberti	E19
Logan Granger	E10
Olivia Griffin	E6 E9
Ryann Henry	C10
Justin Hillis	E7
Chris Isaac	E14
Jenna Jacinto	C21
Paul Jacobson	A1
Camryn Keegan	
Julianna Koman	C20
Alexandria Lovasi	E20 E17
Kyle Maggio	E12 E15
Alyssa Mancini	B1
Alexa Matkiwsky	E12 E15
Mary McManus	B2
James Moore	A1
Emma Murphy	E8
Mira Poelzer	E22
Lauren Pouliot	C13
Megan Prettyman	B2 E5
Julia Rossback	A2
PJ Sampino	E16
Allegra Simon	E13
Amanda Smentkowski	E6 E9

Gianna Smith	A1 A14
Amanda Suarez	C11
Joseph Tenedine	C20
Kayla Tracy	E21
Mason Tsaglos	E4
Cassandra Vallon	E20 E17
Reagan Vander Heide	C10
Gianni Walsh	C12
Grace Warner	A1 A14
Hailey White	E21

Wagner College

Christopher Marra	
Donald E. Stearns	

Wilkes University

Amy Bradley	A9
Matthew Jennings	C9 C19
Lisa Kadlec	C2
Anthony Kapolka	
HyeReon Lee	
Del Lucent	A8
Amjad Nazzal	A9
Moe Woodard	A8

Meyli Raylan Baker	A9
Sara Bonn	C9
Bisma Chaudhry	C9
Kayla Eckrote	C2
Kara Foster	A8
Minnie Nguyen	C19
Megan Robinson	C2
John Tondora	C2
Justin Varvaglione	A6
Mayerly Vergara	