

OFFICE OF THE PRESIDENT

April 21, 2023

Dear Campus Community:

It is an honor and a privilege to acknowledge the seventh annual spring celebration of the Center for Undergraduate Research and Creative Activity (CURCA).

I commend the CURCA committee and Director Dr. Lamis Jarvinen for continuing with this important tradition, recognizing, and showcasing the important work of our students and faculty.

At this event each semester, Westfield State University students showcase their intellect and scholarship, putting their classroom knowledge gained to the test through research and creative avenues, both on campus and in experiential learning and internships. This critical involvement propels students to pursue advanced degrees and challenging careers.

CURCA takes the satisfaction and rewards of thoughtful analysis and creativity to a higher level, leading to the progression of education and a springboard to new ideas.

As we continue to look to the future of education, CURCA builds momentum that will result in better health, wellness, and intellect of our community.

Congratulations to our presenters and best wishes to attendees as you explore this scholarly display.

Warmly,



Dr. Linda Thompson
President

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*CENTER FOR UNDERGRADUATE
RESEARCH AND CREATIVE ACTIVITY*

Welcome to our 2023 Spring CURCA Celebration!

The CURCA celebration is an exciting time for our campus as we gather to showcase the research and creative work of Westfield State students across all disciplines. All participating students have explored the process, research, outcomes, and application of their knowledge and creativity to real-world issues. Whether through classroom-embedded work, independent research, or internships, students are provided with an opportunity to develop and demonstrate their skills while contributing to their field of interest through a unique lens and voice.

It is an honor to host this student event and to highlight WSU's commitment to engaging students through creative and innovative experiences. We are excited to showcase the work of over 200 students, presenting over 100 diverse research and creative projects along with 64 original works of poetry displayed on the Wall of Words, an art gallery, and *Persona* open mic event. Our Celebration is further enriched with our WSU Jazz Ensemble led by Ed Orgill, Associate Professor of Music, with Aaliyah Brown, vocals, Bryan Brophy, piano, Raul Maldonado, trumpet, Jarrod Hangle, drums, Will Murphy, guitar, and Braden Collins, vibraphone performing the works of jazz greats. We're thrilled to feature student Samuel Masoud's as he performs his original piano composition entitled "Greylock's Lullaby".

Acknowledgements

There are so many people to thank! First and foremost, thank you to the students for your contributions and to faculty mentors for your tireless work ensuring project engagement and success! Thank you to our collaborators and student contributors from Westfield Promise and Holyoke Community College. Thank you, President Dr. Linda Thompson, Provost Dr. Juline Mills, Academic Affairs, and Board of Trustees for prioritizing undergraduate research and creative activity through funding and advocacy. The dedicated CURCA advisory board members; Prof Roderico Acevedo, Prof Lisa Barao, Anna Boutin-Cooper, Prof Anthony Furnelli, Dr. Lamis Jarvinen, Prof George Ramirez, Prof Jason Ramsey, Prof Amanda Salacinski and WSU alums Samantha Falcone and Jarrod Petersen for your insights, contributions, and advocacy. Thank you especially to Lisa McMahan and Bill Hynes, Office of Advancement, for your generous support. My interns Grace Templeton, Sabine Dizdarevic, and Maria Lempke for their dedication, talents, and contributions to making this event run smoothly and Maria for creating the booklet cover. Thank you to Cindy Vanbeek and all the generous volunteers!

Special thanks to Russell Cyr, Elliot Medina, and Andrew Bonacci for preparing Dower, Tony and Bob in Copy Center for their amazing ability to produce excellent work on short notice, William Connor and Catering staff, Chris Hirtle, Benson Steward and Media Service staff, David Shapleigh and George Ramirez for creating an art gallery, the Marketing and Social Media staff.

Thank you all!



Lamis Jarvinen, Ph.D.

Director, Center for Undergraduate Research and Creative Activity

Spring 2023 CURCA Celebration Program

Registration and Poster Setup

12:00 - 3:00 pm **Registrations & Poster Setup** **Dower Lobby**

Opening Ceremony

1:00 — 1:50 pm **Welcome Remarks** **Dower 127**

Dr. Lamis Jarvinen, CURCA Director

National Conference On Undergraduate Research (NCUR)

Jules Cullinane – Art, National mural artist

Jacob Paddock – Art, National mural artist

Stacy Rodriguez – Biology attendant

Student Summer Undergraduate Research Fellow (SSuRF)

Jamie Gross - “*Genetic control of circadian rhythms on anxiety-like behavior in Drosophila*”. Faculty mentor: Professor Princy Mennella

Christopher Snodderley - “*Remote working preferences of prospective and recent university graduates*”. Faculty mentor: Professor Hillary Sackett-Taylor

WSU Jazz Ensemble

Prof Ed Orgill,

Aaliyah Brown, vocal, Bryan Brophy, piano, Raul Maldonado, trumpet

Jarrold Hangle, drums, Will Murphy, guitar, Braden Collins, vibraphone

“Birks” by John Birks ‘Dizzy’ Gillespie (1917-93)

“Lush Life” by Billy Strayhorn (1915-67)

“Blue Rondo a La Turk” by Dave Brubeck (1920-2012)

Samuel Masoud, piano

“Greylock’s Lullaby” by Samuel Masoud

Oral Presentations

2:00 – 2:10 pm **Autumn Jones '26, Kaleb Hatt '26, Lily Dufresne '26** **Dower 165**

The Impact of Seasonality on the Apex Melanization

Patterns of Native and Introduced Populations of *Pieris Rapae*

2:10 -- 2:20 pm **Sultan Hussein '23**
How are urban butterflies different then natural living butterflies

2:20 -- 2:30 pm **Isabelle Scott '24, Kerin Johnson '25**
Apex Melanization in Native and Introduced Ranges of *Pieris Rapae*

2:30 -- 2:40 pm **Evelyn Morrissette '25**
Different UV Indexes and Parallel Wing Melanization of *Pieris Rapae* Populations

2:40 -- 2:50 pm	Isabella Catao '24, Charlotte Haley '24 Seasonal Effects on <i>Pieris Rapae</i> 's Wing Melanization in Native and Invasive Populations
2:50 -- 3:00 pm	Quinnten Vescovi '24, Ashley DeMio '23 Observing Native wildlife in High & Low traffic areas of Westfield & Barre MA
3:00 - 3:10 pm	Katrina Bingham-Maas '23, Noah Tyler '23 Invasive Plant Survey on the Little River in Westfield, MA
3:10 -- 3:20 pm	Casey Moore '23, Whitney Scott '23, Evan Khordoc '23 The Impact of Dams & Their Removal on Water Quality In the Westfield River Watershed
3:20 -- 3:30 pm	Ethan Gregoire '24 Caffeine Anxiety - The Need for Accurate and Precise Research
3:30 -- 3:40 pm	Liam Foskett '24 CURCA Student Conference Fund Trip: AWP in Seattle, WA.
3:40 -- 3:50 pm	Christopher Snodderley '24 Student Remote Work Preferences

Poster Presentations & Wall of Words

2:00 — 2:50 pm	Poster Presentations (Odd #'s Present) Wall of Words Group I	Dower 134 Dower 120
2:50 — 3:00 pm	Intermission & Change in Posters	
3:00 — 3:50 pm	Poster Presentations (Even #'s Present) Wall of Words Group II	Dower 134 Dower 120
4:00 pm	Raffle Prize Drawing	

Poetry Readings

2:20 — 3:20pm	Open-Mic Poetry Reading, <i>Persona</i> <i>All welcome to participate</i>	Dower 127
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Artwork Display

1:00 — 4:00 pm	Student Artwork	Dower 190
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* = Signifies that a project includes a video or oral presentation on our website

We hope that you can visit projects at your leisure long after the Celebration is over. All projects can be found on <http://www.curca.westfield.ma.edu/>

If you would like to support undergraduate research and creative projects through financial donations, please visit our Westfield State University Foundation Giving page by scanning this QR code. Choose “other” and specify “CURCA”. Any amount goes a long way.

THANK YOU!!



National Conference on Undergraduate Research (NCUR) 2023 Collaborative National Mural Artist Project Winners

The NCUR Murals Project engages national teams of students in the creation of murals in select (interior) spaces on the University of Wisconsin -Eau Claire campus. Participants were selected and placed into teams based on portfolio and abstract submissions. Artists had two and a half days to paint murals.

Jules Cullinane '24

NCUR 2023 – University of Wisconsin-Eau Claire, McIntyre Library

Special Collaborative Artistic Project Winner – Human Health and Wellness

My art journey began with cartoons. I spent hours as a kid replicating my favorite characters from the screen onto whatever I had near me. I loved escaping into the world of what I saw on TV, imagining myself there. Additionally, I have watched my dad go into surgery almost twice a year since I was born, my brother was diagnosed with Type One Diabetes, and I developed a rare autoimmune condition. I saw my relationship with my health begin to impact how I create art. I started using material that was difficult or completely impossible to erase, teaching myself to be more comfortable with mistakes and marks that were not "intentional". My process changed from drawing what I see in front of me to drawing what I feel, mapping out my emotions on paper, and converting those feelings into artwork. I am interested in being part of a collaborative team that works on the theme of human health and wellbeing. My health experiences have helped me to cultivate more efficient and effective team-skills. Being sick, I couldn't do everything on my own and that was a hard lesson to learn. I know how to take other people's suggestions and combine them to include my unique perspective while contributing to the process even if I am not in control. It is my belief that the only thing that separates artists from non-artists is the will to create. This passion has driven me for as long as I can remember. There is nothing more that I want to do than share what I make with the world and I'm excited by this opportunity to create a collaborative mural with unique and diverse artists.



Jacob Paddock '25

NCUR 2023 – University of Wisconsin-Eau Claire, Haas Fine Arts Building

Special Collaborative Artistic Project Winner – Equity/Diversity/Social Justice

Little matters more to me than nature, mother nature, my nature, the nature of things has always captured my curiosity. Artists such as Wilhelm Theodor Nocken and Rebecca Livermore inspire my perspectives and embolden my artistic approach. Their work captures the scale and vibrant color usage, renewing me with a sense of wonder. I often start by creating inventive source photos and sculptures that are translated into a painted medium. While painting I employ a wet brush sketching method on the canvas to build a base layer that I methodically add onto, utilizing different brush sizes and texturing methods. Above all else I seek to feel connected with my paintings, occasionally using my hands as my utensils. My work incorporates raw emotions that become the closest to someone looking through my eyes, to understand my nature. Although my work primarily focuses on male mental health and the silent suffering we experience, I would be interested in collaborating on Equity/Diversity/Social Justice mural project. I would like to focus on the diversity of human existence and the endless possibilities to create beautiful murals with many perspectives and voices. I possess strong team-oriented skills, incorporating viewpoints and ideas of others to create a unique vision. I believe that I also possess leadership skills both from my role as a senior undergraduate student artist as well as qualifications as the Chief Music Director for WSKB which has me coordinating around two dozen DJs alongside the general manager to create a welcoming and diverse community. I look forward to this incredible opportunity.



School of Business, Mathematics, Computing, and Sustainability

Computer and Information Science

Poster No.

Ari Bannish '23, James Summa '23, Jacob York, David York '24

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Faculty Sponsor: Professor Steve Boughosn

Algorithmic Improvement

Attending the 27th Northeast Regional annual Consortium for Computing conference(CCSCNE) at Ithaca College. Competing in the programming competition that's held at CCSCNE and reporting back on our methods of study, and experience while attending the conference. The purpose of our research is to find the best methodologies and practices to become a better programmer, and problem solver. It's a specific team's three-month experience in expanding their problem-solving skill, implementation time, and program implementation and analysis. Data has been gathered by solving problems from previous CCSCNE's competitions. Specifically, metrics concerning speed to implement an algorithm and the efficiency of the algorithm in big O notation in memory and speed with varying data input. It's expected that competition and team cooperation has made each team member a better programmer. This would mean that: 1: Improved time to implement a solution to a specific problem. 2: Better algorithm efficiency per an implementation. 3: Pair or group programming might be better as a tool learning when programming than programming alone.

James Summa '23, Noah Kelly '23, Glenn Lane '23, Jacob York '24

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Faculty Sponsor: Professor Ruth Kurniawati

Nestor Runner

We would like to present our software engineering project, which is a Nestor themed scrolling game. A scrolling game is one where the playable character stays in place while the background and other entities scroll through the screen, making it appear as though the character is moving. Technologies used for this project include Git version control, GitHub, JavaFX, and Maven. First, we designed the project architecture, then we created a set of features we would like to be implemented. We would pick from the list of desired features and work independently to implement them. We meet frequently to discuss progress and work through blockages. Some challenges we faced involved using Model-View-Controller architecture, cooperating in a group, and implementing physics calculations. The game is currently in development, but we already have an enjoyable game where people can play as Nestor the owl. Before the end of the semester, we hope to have additional features such as allowing players to compete for a high score.

Poster No.

Brenden LaForest '23, Evan Shannon '24, Dan Shlykov '24, Spencer Wakefield '24 **92**

Faculty Sponsor: Professor Ruth Kurniawati

Nestor's Murder Mystery

Nestor's Murder Mystery can be played online across multiple devices anywhere with a Wi-Fi connection. You can assist Nestor in solving this murder case on his brand new train line. Or, if you want to take a classical approach you can gather your friends around a single computer and play it like your parents used to play in our "HotSeat" feature! It's a game that can be fun for the whole family. This game was made by a team of computer science students using scrum methodology and agile principles. The game uses MVC architecture and multiple object-oriented design patterns, such as the factory and singleton methods. The technologies we utilized include the Java programming language, JavaFX for our GUI, and GitHub as our version control. If our game sounds fun to you then come on over and give it a try! You'll have a blast and hopefully learn something about software engineering along the way.

Economics

Christopher Snodderley '24

Oral Presentation

Faculty Sponsor: Professor Supriya Sarnikar

Student Remote Work Preferences

The rise in technology and a global pandemic has led to a rise in jobs that allow working from home. National studies have shown a rise in the number of remote jobs. These studies provide insight into national trends but none have focused on Westfield students and their preferences. Students and alumni at Westfield State University were polled on their preferences for remote working arrangements. The results of this study is useful for local employers looking for insight on a changing workforce.

Geography, Planning and Sustainability

Poster No.

Christopher North '23

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Faculty Sponsor: Professor Alina Gross

Strategies for Community Involvement and Revitalization of Historic Property for Westfield, MA

Preserving a community's history and culture is essential to revitalizing its economy and ensuring the community keeps its historical origins intact. Some of the ways this can be addressed is by examining policies needed to maintain cultural identity and ways in which citizens can participate in a city's plan to revitalize or preserve property, whether it be a building, landmark, or downtown area. The approach taken to achieve this examination of preservation was to perform a content analysis. Various regions worldwide have tried to adopt historic preservation strategies in enriching their historic integrity, and there have been several obstacles preventing these communities from genuinely expressing their culture and history. This research aims to distinguish the type of preservation taking place and how the public has participated in such methods of preservation. Pros and cons were also considered when recognizing the strategy each district and region took to preserve their history. Gathering information and examples of global, national, and regional preservation approaches helped to determine the direction of historic preservation the City of Westfield can take and where there needs to be more opportunities for community engagement. It will be beneficial to examine obstacles specific to Westfield that might make historic and cultural revitalization more difficult. Determining the public's feedback of existing preservation ideas would also aim to bring to light Westfield's historical and cultural beginnings.

Samuel Hilton '23

22

Faculty Sponsor: Professor Alina Gross

Feasibility of Solar Power Integration on College Campuses

This research project has been conducted for two main reasons, the first being the limited existing literature regarding college campus utilization of solar technologies. This allows universities to leverage both lower electricity costs for financial gain as well as creating a more resilient internal grid which is centralized around clean energy. The second is the state of climate change in today's world. With college campuses being large scale operations which consume an immense amount of electricity annually, it is critical to transition these campuses to a cleaner energy system in hopes of making stride towards the larger goal at hand. In order to gain insight on the topic, virtual interviews were conducted with two sustainability professionals who work for two different colleges that have integrated these technologies—Endicott College and Hampshire College. The findings of these interviews were apparent: Purchase Power Agreements (PPA) are often used as it allows for low upfront costs and a fixed rate on electricity from the grid which is usually lower than market rate. Secondly, each school has a different plan on how to integrate the systems as there are various variables that come into play due to existing infrastructure, land availability and sun exposure. Lastly the importance of batteries which aids in the storage of electricity which can be used during peak usage hours. In conclusion, solar is feasible for college campuses as there are many ways it can be implemented with manageable financial stress.

Geoffrey Klafeta '23

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Faculty Sponsor: Professor Alina Gross

Implementation of Bus Rapid Transit in Small- to Mid-sized American Cities

This research was performed to study the planning process involved in the implementation of bus rapid transit (BRT). It aims to create a foundation for how a feasibility study could be applied to small- and mid-sized cities, using Springfield, Massachusetts as a case study. The approach consisted of a GIS route and ridership analysis to assess the current transit demand at different points in the Springfield bus system. A stop placement analysis was performed based on which stops on the route received the highest ridership in October 2022. A road safety audit was performed in the field to assess existing conditions and to observe any conflict generators between modes of travel. Interviews were conducted to learn how planners may begin the process of studying transportation projects in their communities. It was found that State Street has some of the heaviest transit ridership in Springfield. Road widths allow for the potential to reconfigure and potentially install BRT at this location. Planners were generally in support of safe street design and traffic calming. These points suggest that Springfield's State Street could be an excellent candidate for BRT due to ridership statistics, crash history, and vehicle speeds. It has been demonstrated that Springfield has unique qualities that other cities may not, which presents both opportunities and challenges for BRT prospects at this location. These findings can be used when considering whether BRT may be an opportune consideration in other American cities of a similar size and population density.

Abigail Bradley-Gilbert '23

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Faculty Sponsor: Professor Alina Gross

User Experience and Staff Collaboration at Stanley Park

The purpose of this case study is to understand the ways people use Stanley Park, a non-profit, privately-owned park in Westfield, Massachusetts for recreational purposes. This study also aims to find out what makes a green space appealing to park users. Interviews were conducted with members of the park's staff as well as members of the public. Research on case studies of other parks in the United States, both public and private, was also conducted. The park director and the staff were interviewed about park usage and management and park users were interviewed about their experiences at the park. The preliminary findings suggest that parkgoers and park administration must collaborate to create a safe and productive space. Findings include that the role of the park ranger is important in fostering a feeling of safety in Stanley Park.

*** Ryan Hurley '23**

23

Faculty Sponsor: Professor Alina Gross

Land Surveyors Relationship with the Public and State Entities

Land surveyors play an important role in helping us determine which land is suitable for development and recreation. The study was undertaken in order to gain a better insight of land surveyors and the relationships they have with the general public and state entities alike.

Methodology included interviewing two land surveyors from Hancock Associates about the day to day responsibilities, their relationship with public and state entities, and memorable experiences that they have had throughout their career. Findings suggest that land surveyors are responsible for helping Fish and Wildlife Management manage conservation land throughout the United States, and that planners rely on land surveyors as they need accurate measurement of property lines and precise mapping locations. Overall, land surveyors are an integral part in the community, and in protecting the environment. Without land surveyors, planners, real estate professionals and other stakeholders would struggle in determining precise locations on maps, and determining which land is suitable for development.

Kathleen Prescott '23

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Faculty Sponsor: Professor Alina Gross

Public Participation and Nitrogen Pollution from Wastewater Treatment Systems

This project was conducted to discover how public participation can aid in the decisions surrounding nitrogen pollution from wastewater treatment systems. Nitrogen pollution is detrimental to the environment because it degrades water and causes overgrowth of algae in bodies of water. Content analysis was used to review town/city websites, scholarly articles, and news articles related to public participation and environmental challenges. Data was systematically collected based on variables such as master plan development, environmental issues, geographic areas, and public participation methods. After this was collected, it was organized and analyzed to determine application to public participation and wastewater treatment systems. This study found that public participation is crucial in determining environmental decisions. Activities such as informational meetings, public forums, and citizen working groups were found to be beneficial in the process of planning a change to the environment. Once the change is proposed to a community, public participation allowed for opinions and different point-of-views to be shared. Findings indicate that public participation methods such as public meetings and citizen working groups would be beneficial to utilize when decisions regarding nitrogen pollution from wastewater treatment systems are in the planning process and the public should be educated on the information relevant.

Katherine Baldiga '23

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Faculty Sponsor: Professor Alina Gross

Zoning for NOR: A Case Analysis of Human Composting Facilities in the Northwest

Human composting (Natural Organic Reduction or "NOR") has been legalized in six states as of January 2023 and provides a modern, environmentally friendly way of turning the dead human body into fresh soil using warm air and compost materials (woodchips, hay, plants) inside of a closed chamber. Decaying as environmentally-conscious as we lived shouldn't be hard; much less than the hardline uphill-climb to execute it can be in many communities. With changing attitudes surrounding what we can do with our body after death, planners have a unique hand in how the disposition of the dead emerges on the municipal landscape. Until recently in the US, legal disposition options in all states included: traditional cemetery burial, flame cremation, and donation to medical science-- that was generally it. Disposition of our dead is an unavoidable consideration in city planning and with the climate crisis pushing us to explore less impactful ways of living--and in this case dying--new methods have emerged. The purpose here is to examine the spatial and regulatory relationships between emerging NOR facilities and their communities. The applied method involves case analysis of three NOR facilities in the Northwest (in WA and OR) where the practice is currently legal and occurs on-site. Design elements include GIS analysis utilizing demographic and spatial data. Further content analysis of municipal zoning regulations was performed to provide a framework for comparison. Preliminary findings suggest strong demonstration of impactful planning regulations and the role zoning plays in the landscape of new death technology.

Management and Marketing

Poster No.

- Brynn Friedhaber '23, Michael Foley** **13**
 Faculty Sponsor: Professor Anthony Furnelli
The Rise and Fall of Instagram
 This project examines the app Instagram and compares its beginning stages to the current state of the app. We take a deep look into the app Instagram and analyze the strategies the app used in its prime, compared to how the app is operating today. With social media becoming a predominant aspect of society's daily life, inevitable changes have created greater competition with its rivals. We look to answer the question, "How does Instagram compare to its rivals, and what changes will be implemented to improve brand loyalty?" This study was conducted using secondary research data.
- Harsh Patel '24, Alyn Pierre '23** **16**
 Faculty Sponsor: Professor Anthony Furnelli
Instagram's Privacy & Tracking
 Our project is based on the arising issues that Instagram users faces when it comes to privacy and tracking. The research will provide examples of how Instagram tracks users and how that data is used. As well as how users react to privacy concerns. This study was conducted using secondary research techniques.
- Nathan Girard '24, Sam Gallagher '23** **14**
 Faculty Sponsor: Professor Anthony Furnelli
Social Media Privacy Issues
 Due to the increase in internet activity levels, users have been experiencing a breach of their personal information. Many companies use their databases to share users' information based on their preferences or those of third-party app users. Our research proposal will analyze where these issues originate from and what steps can be used to prevent any possible hackers from accessing users' information. This project also shows how companies share users' information for their own benefits. This study was conducted using secondary resources.
- Olivia Griffin '23, Issaiah Jackson '23** **11**
 Faculty Sponsor: Professor Anthony Furnelli
Tik Tok Advertising Controversies
 Tik Tok has merged as a major play area in the social media landscape. Along with that rapid growth has merged a number of controversies around its advertsing and data collection details. For example, a big media platform being owned by foreign identity forms controversy around China because of the other foreign countries that use the platform. This poster will look at the advertising platform and some of the controversies that emerge from the app.
- Brian Chalmers '24, Gerard Mcmanus III '24, Austin Blessing** **18**
 Faculty Sponsor: Professor Anthony Furnelli
The Importance of Search Engine Optimization (SEO) in E-Commerce.
 This presentation provides an overview of the effect of SEO in E-commerce. We will explain the importance and most effective techniques used by the most successful E-Commerce businesses.

Poster No.

- Lucia Sanches '25, Hayden VanBeek '23** 8
 Faculty Sponsor: Professor Anthony Furnelli
Will BeReal be here in 5 years?
 Throughout our research we have learned the overall popularity of BeReal. In 2020, we saw the app emerge as a popular option to show real time photos while connecting with friends. Now with bigger social media companies they are trying to influence what BeReal does into their apps.
- Sophia Dello Iacono '23, Jeff Eisenbach '23** 12
 Faculty Sponsor: Professor Anthony Furnelli
Generational Age Group Comparison: Selling to Gen Z, Gen X, Gen Y, and Baby Boomers
 This project focuses on understanding each generational group and how to better market to them. Further discussing how each generation will impact in the following years. This study was conducted using secondary resources.
- Cassandra Cooley '23, Cheyenne Courtney '25** 9
 Faculty Sponsor: Professor Anthony Furnelli
Is Instagram A Dying Platform?
 With competitor brands on the rise, this project investigates if Instagram is still worth investing in for advertising purposes. We delve into the different advertising options, as well as the pros and cons of investing into the platform as part of a social media marketing plan. We follow this with current statistics and projections for the future from a digital marketing perspective. This study was conducted using secondary research techniques.
- Michael Manning '23, Karina Mejia '24** 17
 Faculty Sponsor: Professor Anthony Furnelli
Meta Advertising Overview
 In this project we will be discussing Meta advertising, how it works, and how we are evolving! We are discussing how Meta advertising works and the difficulties that follow. We will also be discussing the issues and controversial aspects of Meta advertising.
- Riley White '23, Richard McGuire '23** 15
 Faculty Sponsor: Professor Anthony Furnelli
Does BeReal's advertising opportunities provide growth for outside companies?
 This poster shows how BeReal's role in social media helps develop revenue for other companies due to the fact of how BeReal can help promote products without directly doing so. Due to this there are several benefits to this type of marketing because it shows companies or brands in people's everyday lives when they post a picture to the BeReal app. They will continue to provide growth by providing a different way of approaching social media compared to other companies.
- Weaam Choqri '23, Joey Janowicz '23** 19
 Faculty Sponsor: Professor Anthony Furnelli
Snapchat Advertising Overview
 Our project takes an in-depth look at Snapchat's advertising system. We will review the business model and revenue model. We will also discuss the in-app features and the challenges they have faced in order to drive in stickiness. Snapchat places ads in between the stories function to ensure people will always be exposed as they're swiping through. They've also incorporated ads through a subscription method that has generated over 3 billion in revenue since 2021

Anthony LaMarca '23, John Kraus '23

10

Faculty Sponsor: Professor Anthony Furnelli

How can Twitter break even?

As our world changes, social media is at the forefront of branding and as technology evolves social media is how you portray yourself to the public and your brand. In this presentation we will provide insight into how twitter can do more than just survive in an ever-changing social media landscape. We will explain things such as why Twitter has been in the news for the wrong reasons. This study was conducted using secondary research.

School of Criminology, Psychology, Social Justice, and Public Policy

Psychology

Poster No.

Lexus Mastromatteo '24

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Faculty Sponsor: Professor Alex Daniel

Caffeine and its Effects on Attentional Variability in College Students

For most college students, caffeine is a staple of daily life (Godson, 2022). Caffeine is a stimulant characterized by its ability to reduce fatigue and increase alertness (dea.gov). Past research has shown caffeine to reduce latency in an attentional bias task, such that participants that drank caffeine respond more quickly than participants that drank a placebo (Lorist et al., 2003). More recent research in the field of attentional bias has emphasized the role of attentional variability, which is the fluctuation of attentional processes overtime. We hypothesized that participants that drank coffee would exhibit reduced attentional variability as well as faster reaction times. College students were randomly assigned to two groups: a caffeine group and a decaf (placebo) group. They then participated in a traditional dot-probe task, by which their reaction time was measured across three trial types: uncued trials, cued trials, and distractor trials. Participants were also given two additional tasks that measure short-term memory and prospective memory. Like previous literature, we found that participants who consumed caffeine responded faster across all trial types. They also demonstrated reduced attentional variability compared to the control group, confirming our hypothesis.

Jamie Goodall '25, Karina Little '23

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Faculty Sponsor: Professor Princy Mennella

Human vs Computer: Evaluating the Accuracy of a Behavior Analysis Software in Drosophila

To reduce the subjectivity of analysis and to expedite analysis of behaviors in animal models, behavior analysis software have been developed. Most of these software tools have been developed to analyze larger animal models, such as rodents or fish. In this study, we are examining the accuracy of the Noldus Ethovision Software in analyzing recorded Drosophila behavior. The program analyzed behavior in an arena and the results were compared to the same videos scored by eye. Analysis is currently underway to determine which is better, the computer or human in analyzing Drosophila behavior.

Karina Little '23

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Faculty Sponsor: Professor Princy Mennella

Do Altered Circadian Rhythms Affect Anxiety-Like Behavior in Drosophila Melanogaster?

Altered circadian rhythms (CR) are a feature in many psychiatric disorders. Drosophila Melanogaster has similar CR-regulating neural structures as mammals. We aimed to establish a causative link between altered CRs and anxiety. No significant differences were found between flies exposed to all-dark, all-light or equal amounts of light and dark, in their anxiety-like behavior. Our small sample size may have contributed to the negative results. We plan to address this factor in the coming months.

School of Education, Arts, Communication, and Humanities

<i>Art</i>	<i>Poster No.</i>
<p>Alyson Locke '23 Faculty Sponsor: Professor George Ramirez <i>Baked, Brewed, & Buzzed</i> Baked, Brewed, & Buzzed is a capstone thesis project developed for my Senior Capstone course. The purpose was to incorporate all of my skills in Graphic Design into a self-driven project. All research (primary and secondary) were conducted before applying any images or color to the topic.</p>	103
<p>Abigail Hang '23 Faculty Sponsor: Professor George Ramirez <i>Diverge</i> Diverge is a capstone thesis project developed for my Senior Capstone course. The purpose was to incorporate all of my skills in Graphic Design into a self-driven project. All research (primary and secondary) were conducted before applying any images or color to the topic.</p>	104
<p>Elizabeth Harrell '23 Faculty Sponsor: Professor George Ramirez <i>When Period Products</i> When is a graphic design project for my Senior Thesis Capstone course. All material was researched through surveys, target audience contact, moods, and visual references.</p>	105
<p>* Jean Ganek '24 Faculty Sponsor: Professor George Ramirez <i>Lamella</i> Lamella is a research design project developed in my Graphic Design I course. Our purpose was to create a brand design using a combination of animals and industry known products. As a biology major, I decided to branch out and use mushrooms as my visual drive instead. My chosen industry product was tea.</p>	Video, 106

Communication

Poster No.

*** Tara Wallace '24**

63

Faculty Sponsor: Professor Sinuk Kang

TW Creative Online Portrait hosted at www.tarawallace.com

In this digital age it is important to have a professional presence online. TW Creative, hosted at www.tarawallace.com is the base of my online portrait showcasing my experience as a creative professional with samples of my work over the past twenty years. As a freelancer, I've been able to collaborate on a diverse array of projects in a variety of lead roles on sets throughout the United States, Europe, Australia, Asia, and the Caribbean. I have enjoyed opportunities to work as an Onscreen Talent, Wardrobe Stylist, Production Coordinator, Talent Manager, Art Director, Producer, and Creative Director. While studying at Westfield State University I have had project based learning in many of my classes, to my delight! A selection of my best work from these professional and student projects are available, highlighted, or mentioned. TW Creative Online Portrait offers viewers the opportunity to see a broad assortment of my skillset and experience through a variety of completed works presented on the projects page. A written account of my professional experiences, clients I have worked with, and my educational accomplishments, along with some fun behind the scenes footage are presented on the about page. The contact page enables viewers to reach out to me directly or connect with me on social media. It is my goal to have an excellent professional online portrait where potential employers, clients, and collaborators can get to know me as a creative, see some of my best work, and have the ability to connect with me directly or on social media.

English

Emmelia Habib '25

67

Faculty Sponsor: Professor Beverly Army Williams

Creating a zine to help educators support children whose parents are going through a divorce.

My project is an informational zine, which includes ways educators can help a child through a difficult time in the most straightforward way possible. Each page has a different way to help. I created this for teachers to help their students whose families are going through a hard time. Each child has a different homelife, and it is important that teachers have background information and are knowledgeable about how divorce affects children. Divorce especially is a very hard change on children. The question was researched by looking at journal articles, and different websites. This research matters because children don't know how to process their emotions that well, so educators need to help them understand. This zine will make a change because it will give teachers/educators a "one stop shop" for help and advice.

Kathryn Burns '24

70

Faculty Sponsor: Professor Beverly Army Williams

Speech therapy in schools

How does speech therapy have an effect on children in school? I will be creating a FAQ, frequently asked questions, for parents about speech therapy. The project examines how speech therapy affects children, and how it operates within school systems. The FAQ explains the pros and cons about speech therapy..This information should help parents conclude if speech therapy is the right path for their child to endure.

Katelyn Beddia '25

72

Faculty Sponsor: Professor Beverly Army Williams

Reforming Massachusetts Prison Healthcare

Although prison healthcare has been undergoing reformations, inadequate healthcare still plagues many public prisons in Massachusetts. The purpose of this research is to determine how Massachusetts' public prisons can use reforms to eliminate the healthcare disparities in their incarcerated populations. Alongside this, it examines Massachusetts' previous reforms and their success rate. Pursuing this question matters because it will decrease prison mortality rates, as well as increase awareness of the current state of healthcare. Both of which lead to better overall public health. This research's charts, images, and statistics are best represented in an infographic. As a future criminal justice employee one is required to get vital information to the public in a fast yet informative manner, and an infographic does precisely that. This research topic was explored by examining journals, articles, and dissertations. Each of these sources provides key data supporting the claim that healthcare in public Massachusetts prisons should be reformed. In tackling the problem of inadequate healthcare in public Massachusetts prisons, this research will inspire reforms initiated by the Massachusetts Department of Corrections. These reforms matter because not only will they improve public health relations outside of prisons, but the overall health climate as well. If inmates are treated adequately while incarcerated, they will have a positive impact on the health of non-incarcerated populations.

Kerry Donnelly '25

68

Faculty Sponsor: Professor Beverly Army Williams

Dealing with memory loss diseases and how to support those in need.

What are tactics, tools, and methods to help support seniors ages 60+ with memory loss diseases in a comforting way? Dementia is on the rise right now with 60 million plus people nationally suffering from it. Being educated on the topic will aid those who encounter dementia and those who are caregivers to people with dementia. I am creating a blog post to share my research. Blog posts are very common and have a format that is easy to understand; this genre also will allow me to reach a large, widespread audience. The question was researched by reading different informative articles, watching Ted Talks discussing the question, and as well as a video where a caretaker discusses what it is like to take care of a person with dementia. My research brings up methods to help people who are dealing with loved ones with dementia to make both the caretaker's and loved one's lives easier. They are able to use strategies I have given and apply them to their situation.

Samantha Brody '25

111

Faculty Sponsor: Professor Beverly Army-Williams

How does culturally responsive teaching affect students? The impact of culturally relevant teaching in a classroom k-5

Why should teachers use responsive teaching in their classrooms? Using culturally responsive teaching is important in education because it teaches students to understand different perspectives. I created a research-based pamphlet for education students and other people interested in the topic. The pamphlet is an effective way to distribute my information because it's small, easy to navigate, and can be carried around with ease. The question was researched by looking at different articles, journals, and videos. I have also used first-hand knowledge I have seen in the classroom setting. My research continues the current conversation and educates others about Culturally responsive teaching, an important topic in education. As a future educator, I am committed to helping to educate others on the importance of culturally responsive teaching and to helping my future students by providing this in my classroom.

*** Shawn Major '25**

69

Faculty Sponsor: Professor Beverly Army Williams

Do you have a Fixed Mindset? Cultivating a Growth Mindset can change your life!

Having a Fixed Mindset means to believe that you can't change with no room for growth. Having a Growth Mindset means to believe that you can grow with the challenges that are thrown at you, always willing to learn new ideas. The reason why I chose this topic is because I have had a fixed mindset for a long time with no realization until attending my Comp 2 class. As my journey with adapting to a Growth Mindset progresses, my mental health has begun to have more of a positive outlook in my walk in life. You can't just achieve this new way of thinking overnight. It's best to grow in small steps to eventually acquiring attributes that correlate with having a Growth Mindset. An example of having a Growth Mindset is when you receive a poor grade in your midterms. You don't just apply little effort to the class for the rest of the semester. You actually learn from what you did wrong and approach the material in a different way, that could help you improve in your academics. On the other hand, having a Fixed Mindset in this scenario. You would receive that poor grade on your midterm and not change any of your study habits and proceed to cheat on your HW assignments. Of course life isn't easy, but having this Growth Mindset will grow you into the person you are meant to be. When I wrote this song, my intention was to motivate people and spread awareness of how we think impacts our life dramatically.

Alexis Pratt '25

65

Faculty Sponsor: Professor Beverly Army Williams

Effects of Culturally Responsive Pedagogies on Bullying

How can incorporating culturally responsive pedagogy into the classroom help students who are being bullied? Culturally responsive pedagogy is a research-based approach to teaching, which connects students' cultures, languages, and life experiences with their learning. By teachers having a culturally responsive pedagogy, they are helping students make the classroom a safer place. If students are aware of the different cultures, races and more, then bullying will lessen as most cases of bullying are due to a child being labeled as different. My project is a tri-fold poster which will address important definitions, reasoning for the pedagogy, importance and ways that classrooms can adopt a culturally responsive pedagogy. I decided on this genre because I feel that you need to catch peoples eye to get their attention about something important, by making it look good which I believe I can accomplish through my poster. My research matters because as a future educator I am concerned with the safety of students in the classroom and for those who are parents, guardians, family or even friends may also show these same concerns which will be addressed through my poster. Throughout my research I have discovered that students feel safer being themselves in the classroom if they are represented through books, lessons, and more. As students learn more about themselves and others, they will not only make the classroom a community but will also have a broad understanding of the society around them, which will benefit them in life. My goal of this project is to raise awareness educators about the importance of being culturally responsive.

Jillian Lemon '26

39

Faculty Sponsor: Professor Vanessa Diana

Why are dreams important?

Everyone dreams whether they remember them or not; some have similar dreams while others can be completely bizarre. No matter what kind of dreams you have, they all contain the same potential to be used in creative ways. In my research I looked at information from the psychology field and the science field. I dove into different kinds of dreams and what they mean, different dream function theories, tips on how to remember your dreams, and examples of how dreams have been used for things such as problem solving. This topic is extremely important; in one of my sources I read about a research study conducted on college students. They were asked to think about a chosen problem before they went to bed. Most of the students in the study felt through dreaming they had at least assessed their problem if not solved it. This is just one example of how to use your dreams to benefit you in your conscious life. My poster has examples of how dreams have been used creatively and as inspiration for famous creators like Beethoven. All the way from Beethoven to Westfield State students, dreams help us with our lives.

Xavier Merkman '26

77

Faculty Sponsor: Professor Vanessa Diana

Why My History Matters

Critical Race Theory (CRT) is the acknowledgement that racism in America is more than just personal racial bias but rather that it is embedded in laws, policies and institutions. In Florida, Gov. Desantis has passed the Stop Woke Act which banned the teaching of CRT and stops businesses from requiring some diversity/inclusivity training. This is a huge problem not only for students whose education is being directly affected, but for other American residents as well. As an African American, this directly affects me. In my life, Critical Race Theory isn't a theory. It is an undeniable truth that stains every page in the book of my life. It is the history of my people and by erasing it from education you kick it under the rug. This law effectively bans the teaching of my history as it happened. To truly understand my topic, I draw on scholarly sources such as the NAACP Legal defense fund and CRT centered books like Critical Race Theory published by the New York Press. The goal of my poster is to effectively communicate what CRT is, why it's important, why the Stop Woke Act is so problematic and how you can help.

Chase Jacob '26

83

Faculty Sponsor: Professor Vanessa Diana

ADHD: The Hidden Superpower

Approximately one out of every 10 children who are born now is diagnosed with ADHD. ADHD is becoming more common among young adults. Symptoms of Attention Deficit Hyperactive Disorder (ADHD) are impulsiveness, an inability to relax, difficulty listening, problems with organization, an inability to finish or remain focused on tasks, difficulty controlling emotions, and isolation. Most people believe that having ADHD is a disadvantage within school systems due to the fact that those with the condition need accommodations and an extra push to get going, which creates a stigma for students with ADHD. But there are also positive symptoms of ADHD, for instance, having a fixated mind, an abundant amount of energy, creativity, really good conversational skills, and spontaneity. These beneficial symptoms of ADHD can be used as an advantage. This project draws upon research and personal experience to review what ADHD is, the types of ADHD, the benefits and side effects of medicine for those with the condition, differences between the brain structures of those with and without the condition, and misperceptions of those with ADHD. ADHD is now one of the most common neurodivergent and neurodevelopmental disorders. This poster is to teach the audience that ADHD can be seen as a double-edged sword. The symptoms of ADHD that can create challenges for students are also the symptoms that make it a superpower.

Joseph Bonilla '25

84

Faculty Sponsor: Professor Vanessa Diana

Schizophrenia in Puerto Rico: Sociocultural and Developmental Influences on Delayed Diagnosis

My late grandaunt, Lucy lived in a rural village in Puerto Rico, where socio-cultural biases delayed diagnosis and resulted in ineffective treatment of her schizophrenia. Research shows this is not an uncommon experience for people with serious mental health illnesses in Puerto Rico. This project reviews socio-cultural and developmental factors causing and delaying diagnosis rates of schizophrenia throughout Puerto Rico. Schizophrenia is defined as a serious psychiatric illness characterized by disruptions in thinking processes, perceptions, emotional reactivity, and social interaction. Symptoms include hallucinations, disorganized thinking, paranoia, social isolation, and more. Modern medications for people with the disorder take about 6 weeks of consecutive cooperation to start showcasing its benefits. For Lucy, this would never happen because she had not received preventative care after her first psychotic episode. Genetics, environment, altered brain chemistry, and structure may be contributing factors to schizophrenia, and a stressful or emotional trigger may induce a psychotic episode. Moreover, culture can influence sickness definition, help-seeking behavior, treatment response, and post-treatment adjustment. Puerto Rico is a small, heavily populated Caribbean island that became a US territory in 1898. It is worth highlighting that residents of Puerto Rico face chronic pressures such as poverty, violence, and a lack of prospect for economic growth. People living in rural areas like Lucy's are more predisposed to environmental triggers for schizophrenia due to a compilation of socio-cultural biases, prejudices, and overall insensitivity towards mental health illnesses which contributes to social isolation.

Hannah LeBlanc '26

82

Faculty Sponsor: Professor Vanessa Diana

The Benefit of Endorsing "The Gap Year"

There are 571 universities/colleges in the United States; however, only a few are household names. Harvard, Yale, Duke, and MIT are among the most notable institutions in the United States and all have something strange in common. These universities, and a few others, have invested in the concept of "The Gap Year." A "Gap Year" is a stretch of time, before or during undergraduate studies, spent away from college but filled with learning experiences. While just 35 higher-ed institutions in the United States have policies encouraging students to take a gap year when needed, all of these 35 are within the top 70 ranked universities and colleges. This ranking looks at the student-to-faculty ratio, graduation rate, retention rate, acceptance rate, enrollment rate, and institutional aid rate. Of these six parameters, three can be directly impacted by "gap years." Why is this important to WSU? When a student takes a gap year, or at the very least has the knowledge about taking one, they can start to view this tool as a sort of safety net. If this student is in the middle of their college career and is starting to feel overwhelmed, taking a gap year could help relieve that stress, leading to a happier and more productive student, which leads to better grades and retention. Federally funded schools, like Westfield State University, receive funding based on parameters like these. In short, students taking university-endorsed gap years increases grades, retention and graduation rates, which increases federal funding for schools.

Ryan O'Halloran '26, Marcus Chrisafideis '26

38

Faculty Sponsor: Professor Vanessa Diana

Nutrition and Recovery For Hockey Players

For our project my partner and I chose to look into nutrition and recovery for hockey players and we were inspired to do that because we are both hockey players as well. We wanted to make a poster with some basic advice on what to eat before, during, and after a game and we also added how to be fully hydrated. From there we then added the effects of alcohol especially for athletes and hockey players because our projects audience is directed towards college hockey players and drinking alcohol is something college athletes come across. All in all our poster is supposed to give college hockey players a general idea of nutrition and what to eat and drink while also adding advice on how to stay hydrated so that you can perform to the best of your ability.

Rona Poku-Mensah '26

71

Faculty Sponsor: Professor Vanessa Diana

American Healthcare students, Ghana needs your help

This poster encourages Westfield State University students going into health care to make a short-term medical mission trip to Ghana. These short-term healthcare workers are needed in Ghana because the country lacks healthcare equipment and staff in the healthcare field. There are more patients than there are healthcare workers to take care of them. That is why Ghana brings people from America to help the Ghanaian hospital workers in rural communities and bring needed healthcare equipment. I researched information on healthcare needs in Ghana and interviewed my cousin, a nurse in Ghana, who told me that healthcare is a big issue no matter where you live in Ghana but it is worse in the rural areas of the country. Therefore, healthcare workers from abroad mostly serve in rural areas because those patients are the ones who need the help. After showing healthcare students why their service is needed in Ghana, I provide information about two organizations that bring American healthcare workers to Ghana for medical volunteer trips.

Liam Foskett '24

Oral Presentation

Faculty Sponsor: Professor Lori (Lee) Desrosiers

CURCA Student Conference Fund Trip: AWP in Seattle, WA.

I'm looking to present my experiences at the Association of Writers & Writing Programs (AWP) Conference as part of my travel reimbursement from CURCA. My trip was deeply valuable to my education at WSU. I helped set up the table of printed copies, flyers, pens and bookmarks for Professor Lee Desrosiers. Throughout the day I greeted people walking by and explained why they should submit to either of Desrosiers' literary journals, Naugatuck River Review or WORDPEACE. Professor Desrosiers also generously allowed me some time to explore and network on the convention floor. A lot of my conversations were with small presses and literary journals looking for writers. Hearing about all the publications from in-person representatives gave me a better sense of who I can submit to or work with. There were also a handful of paying magazines and major publishing companies that I exchanged information with. Swapping writing stories with people I would have never met otherwise was also exciting. I'm currently looking into applying to Masters programs soon, so asking real students and faculty about low residency arrangements, course loads and success stories was a unique chance to learn more. I would love to present my more detailed experiences at CURCA to secure my \$250 reimbursement.

Wall of Words Contributing Authors

Dower 120

Professor Becky Olander — Westfield State University

Alexander Colon '26, Cassandra Eyma '25, Gage Glanville '25, Jack Guindon '25, Nick Hanley '24, Aleksandra Kurc '24, Jessica Kushner '25, Raya Mackechnie '26, Nick Marshall '25, Madelyn Myers '24, Eli Pease '26, Julia Robak '26, Kaytlyn Samuels '24

Professor Michael Filas — Westfield State University

Crystal Betancourt '25, Jody Bullis '24, Jankaleishka Nurgos-Cruz '23, Alexis Crafts '24, Jack Dudley '24, Mekhai Felton '25, Liam Foscett '24, Averie Gatzounas '24, Cora Graves '25, Sean Mescall '24, Thomas Parent '24, Darren Peobody '24, Zoe Pouliot '25, Corey Rososky '24, Chloe Sanfacon '23, Katherine Steele '24, Madelyn Traynor '23

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Professor Beverly Army Williams — Westfield State University

Daniel Currier '25, Hannah LeBlanc '26

Professor George Layng — Westfield State University

Abby Bradley-Gilbert '23, Nathan Crane '25

Professor David Champoux — Holyoke Community College

Angela Tindell-Gula, Rachel Reynolds, Robert Stephen Herrick, Bianca Lopez

School of Health, Natural Sciences, and Human Services

Biology

Poster No.

Brianna Toomey '23

24

Faculty Sponsor: Professor Kimberly Berman

Exploring Tiny Earth to Find Novel Antibiotics

With the rise of antibiotic resistance and the current soil crisis, infectious disease has the ability to spread rapidly within the biosphere. Degradation of the soil environment due to erosion, climate change and farming leaves limited space and nutrients that soil microbes need to grow. Diminishing microbial health in addition to antibiotic resistance genes spreading because of improper disposal and natural selection shifts is a growing concern for public health. With both of these concerns, the purpose of this research is to find novel antimicrobials within the local soil to combat against bacterial pathogens. This work contributes to a larger project, Tiny Earth, which is fighting against antibiotic resistance by using natural resources and ecosystems to find antimicrobials. Through obtaining soil samples around the Westfield area, dilutions and biochemical tests were performed to classify bacterial strains that displayed antibiotic characteristics. Bacterial species were identified using PCR analysis, GeneWiz and a BLAST search from the obtained 16s rDNA sequence. Beyond this initial classification, the next questions ask what are the chemical metabolites that are being used by bacteria to resist pathogens. To answer this, extraction methods of the supernatants and pellets were performed to test organic layers against the pathogens. Through extracting the antibiotic compounds, insight can be given to answer the questions surrounding the rise of resistance and why it spreads so rapidly. Thus, providing answers and possible solutions to the global health concern of antibiotic crisis and the spreading of infectious disease.

John Masi '23

87

Faculty Sponsor: Professor Kimberly Berman

Tiny Earth Soil Microbe Identification

The CDC tracks the spread of, and hospitalizations from, antibiotic resistant bacteria. With over 35,000 deaths a year from antibiotic resistant infections, the need for novel treatments is constantly increasing. There have been studies looking into the effectiveness of bacteriophages and other less common treatments for bacterial infections, but those are not widely available. Finding new antibiotics from untapped sources of bacteria has been the standard for years because it is proven to be effective. One answer to this problem is the Tiny Earth undergraduate research initiative. The Tiny Earth program was developed to help combat the increasing amount of antibiotic resistance pathogens that have been surging through hospitals across the country. The goal of the Tiny Earth program is to discover novel antibiotics and engage college students in the field of microbiology. Participants in the Tiny Earth program have isolated 13,741 microbes, each with some level of pathogen inhibiting ability. This research project focuses on isolating and identifying microbes found in soil samples through selective culture media and various biochemical assays. The goals of this project were to isolate a pure culture of any soil isolates with antibiotic properties against clinical bacteria strains, to identify those isolates through PCR and molecular sequencing, and to determine any unique characteristics of the bacteria, such as hemolysis, mobility, sugar fermentation, and gelatinase activity.

MaKenzie Messier '24, Jessica Peitzsch '25, Sara Russell '25, Arne Christensen NA 34

Faculty Sponsor: Professor Arne Christensen

Fluoxetine Exposure Negatively Affects Wounding Healing in Spinal and Cardiac Regions in *Daphnia magna*

Daphnia magna are small aquatic invertebrates with open circulatory systems and complex immune systems. *D. magna* carapace wounds usually heal in hours or days. Fluoxetine (Prozac) is an antidepressant that belongs to a group of medicines known as Selective Serotonin Reuptake Inhibitors (SSRIs), and has been found polluting aquatic ecosystems. This study aims to explore the effects of fluoxetine on *D. magna* wound healing. We hypothesized that exposure to fluoxetine would increase the rate of wound healing of *D. magna* based on studies in mammalian model systems. In the present study, half of the organisms were exposed to an environmentally-relevant concentration (1 µg/L) of fluoxetine. In each group of control, or exposed, animals, half were inflicted with a wound near their heart (cardiac wound) and half near their apical spine (spinal wound). Animals were imaged, allowed to recover for one week, then imaged again, and fixed for fluorescence microscopy. During recovery, offspring produced by the animals (neonates) were counted. We found that there were no significant differences in rate of wound healing of cardiac vs spinal wounds in either control or exposed animals; however, animals treated with fluoxetine exhibited a significantly reduced rate of wound healing in general ($p = 0.037$). Animals exposed to fluoxetine produced more neonates, but the differences were not significant. Based on our findings, exposure to environmentally-relevant concentrations of fluoxetine decreases rates of wound healing in *D. magna*. Our results deepen our understanding of how fluoxetine affects invertebrates.

John Masi '23, Ola Alsamraay '23, Tim Polevoy '24, Kylxia Rosa Grullon '23, Arne Christensen NA 33

Faculty Sponsor: Professor Arne Christensen

The Effects of Fluoxetine on *Daphnia magna* Wound Melanization, Reproduction, and Heart Rate

Pollution of freshwater ecosystems by pharmaceuticals, and drug metabolites, is an area of significant concern. Pharmaceuticals can pollute waters through manufacturer waste products, improper disposal of medications, and by humans excretion of medications. The purpose of this study was to determine the effects that an environmentally-relevant concentration (1 µg/L) of fluoxetine (Prozac), a commonly prescribed Selective Serotonin Reuptake Inhibitor (SSRI), has on *Daphnia magna* wound melanization, reproduction, and heart rate. *D. magna*, a small freshwater invertebrate, have been shown in early studies to respond to fluoxetine, and are a demonstrated good invertebrate model organism. The present study had two groups of *D. magna*, a control group and a group exposed to fluoxetine. After an exposure period (48 hours), *D. magna* were wounded on the carapace with a small needle, imaged and imaged again at 24 hours and 7 days. Heart beats per minute were quantified through video microscopy, and wound melanization at 24 hours was used as a proxy for cellular wound response. We found that wounds exhibited robust wound melanization at 24 hours, and clearing of melanization by 7 days. Fluoxetine exposure did not have significant effects on heart rate. *D. magna* that were exposed to fluoxetine had higher levels of wound melanization than those in the control group; however, the differences were not significant. Our results reveal general cellular dynamics of wound healing in *D. magna*, which may be conserved across other members of the Order.

Samuel Trombley '24, Cole Bromback '24, Amani Chehimi '23, Arne Christensen NA 32

Faculty Sponsor: Professor Arne Christensen

Daphnia magna Exposed to Fluoxetine with Predator Kairomones Lose Horizontal Negative Phototaxis

Fluoxetine (Prozac), a drug of the Selective Serotonin Reuptake Inhibitor (SSRI) class, is known to affect organisms across the animals, plants, and fungi kingdoms, generally by blocking reuptake, and increasing available levels, of serotonin. Fluoxetine has been found in many types of aquatic ecosystems and could potentially be altering the behavior of resident organisms. The present study investigated how an environmentally-relevant concentration (1 µg/L) of fluoxetine alters behavior in *Daphnia magna*, a planktonic crustacean belonging to the Phyllozoa subclass. Serotonin is known to depress inhibitory responses in a variety of organisms. We tested if fluoxetine exposure in *D. magna* in the presence, or absence, of soluble predator chemicals (kairomones) affected phototactic behavior. We found that *D. magna* exhibited a statically-significant ($p < 0.05$) preference for dark, over light, in control, fluoxetine, or kairomone groups; however, animals exposed to both fluoxetine and kairomones lost significant ($p = 0.09$) negative horizontal phototaxis. *D. magna* are a model invertebrate organism, our results shed light on how fluoxetine may be affecting behavior in other types of organisms in aquatic ecosystems.

Amber Brothers '23, Samantha Martin '23 35

Faculty Sponsor: Professor Arne Christensen

Limb Regeneration in Daphnia magna is Associated with Distal Cellular Enrichment, but Not Affected by Fluoxetine Exposure.

Contamination of freshwater ecosystems can be caused from several factors, including pharmaceutical disposal into the environment. Fluoxetine is one of the many pharmaceuticals that may be affecting these ecosystems. This drug, brand name Prozac, is an antidepressant used to treat several disorders such as depression and obsessive-compulsive disorder. To further our understanding of these effects, *Daphnia magna* were exposed to environmentally-relevant levels of fluoxetine and studied its effects on cellular regeneration of the bifurcated segment of the antennae. It was hypothesized that the fluoxetine group will have faster cellular regeneration than the control group. Batch size of neonates was also examined, we predicted fluoxetine would increase average batch size. This hypothesis was pursued by exposing animals to drug, severing the left antenna where it bifurcates, and measuring regeneration through imaging. The control group was acclimated in COMBO medium with *Ankistrodesmus* sp. for three days, whereas the exposed group also had fluoxetine (1.0 µg/L). After three days the surgeries were performed, images were obtained, and the *Daphnia magna* were placed in their appropriate conical tube. On the tenth day, the animals were fixed and imaged. Viable animals underwent staining for fluorescence (F-actin, membranes, DNA) imaging. The results were analyzed through ImageJ and excel. We found that regrowth for the control group was 0.48 and fluoxetine exposed was 0.12. The standard deviation was calculated to be ± 0.36 for the control group and ± 0.56 for the group exposed to fluoxetine. Finally, the standard error was 0.12 for the control and 0.23 for individuals exposed to fluoxetine. Regrowth did occur, but there was no significant difference between control and exposed groups. Fluorescence microscopy revealed distal cellular enrichment at the site of regeneration. Our results shed light on percent regrowth of the distal cellular enrichment of *D. magna*. Time and resources set limitations on findings, mortality number could have impacted results.

Christina Ciampa '23

91

Faculty Sponsor: Professor Jason Ramsay

Rabbit hindlimb kinematics model: Angular velocity and elastic energy analysis

Kinematics is a modern tool used in furthering musculoskeletal and osteoarthritis research. When rabbits are used as an animal model, this furthers our understanding of human biomechanics, specifically when focused on hindlimb movements. Through hindlimb biomechanics, kinematic patterns in rabbit hopping can be used to determine multiple variables such as landing methods, joint contact force, velocities, and different joint angles. Previous work on other hopping vertebrates points to the use of elastic energy when hopping, leading to our prediction that rabbits store elastic energy in their muscles to support hopping motions. In order to test this assumption, a pet rabbit trained for specifically jumping over various heights had knee and ankle joint angles recorded over six trials. The trials of the two different heights at 15 and 45 centimeters were observed and manipulated through the Kinovea, a biomechanical video annotation tool designed for sport analysis. With hip, knee, ankle, and metatarsal/phalanges movements monitored, the ankle and metatarsals are observed to be moving at the last stages of leg extension, loaded by the large muscles extending before them. Therefore, we can assume elastic energy is being stored. The angular velocity data calculated from the knee and ankle angles support that a longer pre-loading stage for higher jumps is required. This results in higher compression of limbs, making the angular velocity vary in data when compared between jumping heights 15 and 45 centimeters. With limited available data for rabbits as an animal model for kinematics, there is a need for further research that can ultimately contribute to our understanding of human biomechanics.

Sean Clancy '24

108

Faculty Sponsor: Professor Jason Ramsay

Comparing Squid Upper and Lower Beak Function: Puncturing vs Drawing

Cephalopods are a diverse class of mollusks that utilize an equally diverse arsenal of techniques and weaponry that support their predominantly occupied niche as opportunistic predators. These predators are manipulatory feeders; renowned for their sucker-studded arms and tentacles. This retrieving embrace envelops prey to utilize a devastating beak that pierces flesh, scale, and shell. The cephalopod's beak consists of a pair of chitinous mouth parts operated by a complex of muscles called the buccal mass whose flexible pivot is a new field of research. The novelty of the cephalopod beak's joint-type compounds further with its lack of inorganic components usually used by organisms to make inflexible structures such as calcium in teeth. Instead, a layer of buccal cells excretes only organic components to form the beak which follows a rigid gradient using chitin and proteins like pigment. The shapes of cephalopod beaks of many species are well documented but subsequent deviations in upper and lower functions call for more research. Cephalopod beaks maintain commonality in component structures which produces results applicable between species. The puncturing and drawing abilities of longfin inshore squid's upper and lower beaks were determined by applying vertical and lateral performance tests to their beaks, using a "universal testing machine" to measure beak efficiency. Efficiency in beak elasticity was measured through differing limits the beaks experience when biting prey. This model produced force-displacement traces whose respective peaks indicated each point of maximum resistance. This experiment suggested the physiological roles in the feeding process of longfin inshore squid's bipartite beaks and the species' ecological niche.

Marie Gonzalez '23, Sharon Medina '23

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Faculty Sponsor: Professor Jessica Stephens

Population Genomics of the Endangered Pitcher Plant *Sarracenia alabamensis*

Sarracenia alabamensis is an endangered carnivorous pitcher plant native to Alabama, United States, with 4 viable sites out of the remaining 12. The environment of *Sarracenia alabamensis* requires frequent burning and high levels of maintenance, and the lack thereof, along with the illicit collecting of the plant, has led to its endangerment. The project focuses on using leaf samples to extract DNA that can be used to investigate the genetic diversity across the remaining populations. This study aims to extract sufficient quantities of purified DNA from pitcher plant samples using a modified grape leaf protocol with home brew stock solutions. The goal of DNA extractions is to yield pure DNA (nucleic acids), and remove other macromolecules. Once extracted the DNA will be sent off for sequencing using Restriction-site Associated DNA sequencing (RADSeq). DNA purity is measured and quantified using a nanometer and fluorometer. For *Sarracenia alabamensis*, it is crucial to collect additional samples from the remaining population and evaluate their genetic diversity. This research will allow for a better understanding of the survival potential of the endangered canebrake pitcher plant and inform managers on ways to protect remaining population.

Autumn Jones '26, Kaleb Hatt '26, Lily Dufresne '26

Oral Presentation

Faculty Sponsor: Professor Kathryn Weglarz

The Impact of Seasonality on the Apex Melanization Patterns of Native and Introduced Populations of *Pieris Rapae*

Pieris rapae, otherwise known as the cabbage white butterfly, exhibit variation in the apex melanization of their upper wings. To visualize these differences we analyzed two geographically separated populations: native and introduced. A common explanation to these visual differences is caused by temperature shifts throughout the four seasons. Previous research relies heavily on the native ranges, so we decided to investigate introduced ranges as well. Using data from iDigBio, we were able to differentiate the geographical regions and seasonality of our specimens. Similar to previous findings, temperature and seasonal change influence melanization and pigmentation in the upper apex spot of the wing. Our findings indicate a significant difference in melanization between spring introduced and native populations, but no significance among fall, winter, and summer introduced and native populations.

Sultan Hussein '23

Oral Presentation

Faculty Sponsor: Professor Kathryn Weglarz

How are urban butterflies different than natural living butterflies

Comparing Butterfly Melanization Patterns in Wild and Urban Environments

In order to test the hypothesis that urbanization's effects on the environment could have an impact on butterflies' morphological traits, this research examines the effects of urbanization on butterfly melanization patterns. The research will concentrate on the Pierce rapid butterfly, gathering samples from both urban and rural areas, and analyzing the data to determine how much melanin is present on the wings. The accuracy and uniformity of the data will be ensured by data cleaning and image standardization. In order to educate conservation efforts and advance sustainable urbanization practices, the study seeks to offer insightful information about how urbanization affects natural ecosystems.

Christina Ciampa '23

54

Faculty Sponsor: Professor Jessica Stephens

The impact in Springfield, MA of urbanization on plant biodiversity

Cities homogenize physical environments to meet the needs of humans. This homogenization can impact urban plant communities creating selective environments. The effects of urbanization on plant species richness and beta diversity needs to be further studied in order to assess the role that urbanized landscaping contributes to non-native species invasions and biotic homogenization. Here, we are interested in how urbanization in Springfield, Massachusetts has affected plant biodiversity with a focus on non-natives and vulnerable species. Herbarium samples were obtained through the CNH Consortium of Northeastern Herbaria and categorized by “pre-urbanization” time period ranging 1880-1900, and “post-urbanization” time period 1990-1995. We predict that the mean ‘C-value’ (a proxy for sensitive species) will decrease over time throughout the urbanization of Springfield. Additionally, we predict that urbanization will increase the amount of non-native species in Springfield, MA. Our results showed that the mean C-value was significantly higher in the pre-urbanization time period, supporting our predictions. Furthermore, only 3.3% of the total species in the post-urbanization sampling were ranked at a C-value of 8 or higher, while pre-urbanization sampling had 17.4% of the species at or above that rank. Additionally, there was a slight increase in non-native species in the post-urbanization sampling (25.7% vs. 21.7%). This study gathers a concern for not only Springfield, but other urbanized communities experiencing biotic homogenization. Urban areas must stress implementing higher conservation efforts to preserve native species and their habitat.

Isabelle Scott '24, Kerin Johnson '25

Oral Presentation

Faculty Sponsor: Professor Kathryn Weglarz

Apex Melanization in Native and Introduced Ranges of Pieris Rapae

Pieris rapae is a species of butterfly found in a wide range of habitats, which have white wings with black spots, where the white pigment is due to pterins, and the black pigment is formed by melanin. Studies have shown that melanization in *Pieris rapae* has a strong correlation to the temperature in its environment. However, studies have shown that other environmental factors such as diet also contribute to melanization. Our study aims to analyze the scope of limitations of temperature as a prediction for apex melanization. Our hypothesis is that there will be a significant variation in the apex melanization of *Pieris rapae* in introduced and native ranges of the same climate, due to differences in available diet. We choose to only consider apex melanization because the spots on the butterfly are a secondary sex characteristic. For our sample, we use the iDigBio digital database for records of *Pieris rapae* specimens, measured by our group as well as students from the class. We record the measurements of the M3 melanization spots from 200 specimens from both the native and introduced populations in temperate zones from Europe and North America, from the summer seasons. We summarize our data using an ANOVA test. As a result, we fail to reject our null hypothesis; meaning that there is no significant variation in apex melanization in *Pieris Rapae* to suggest a difference in native and introduced ranges.

Evelyn Morrissette '25

Oral Presentation

Faculty Sponsor: Professor Kathryn Weglarz

Different UV Indexes and Parallel Wing Melanization of Pieris Rapae Populations

Pieris rapae, or the cabbage white butterfly, are typically found in open and sunny land. Five to six generations can be born annually, this rapid reproduction and human migration has allowed the species to inhabit various landscapes and ecosystems across the world. *Pieris rapae* is known for wearing 1-3 pairs of black spots on their wings, referred to as wing melanization. This melanization is a sexually dimorphic pattern; both male and female butterflies communicate gender through their dorsal forewing spots. Many studies have provided supportive data that some *Pieris rapae* populations manipulate the pigmentation qualities of their dorsal wing spots (i.e.: brightness, hue, UV reflectance, size) due to inter-sexual selection; such as courtship. In this study, we will be investigating the possibility of microevolution between isolated *Pieris rapae* (female) populations. We will be using melanization data of the Cu3 dorsal spot (indication of a female) and the corresponding UV of the specimen's location. A statistical correlation between melanization and UV index will be analyzed. This study could help us understand the role UV plays in inter-sexual selection and/or thermal regulation.

Grace Emmons '26, Melody Latshaw '26, Madison Boyer '25, Dianyeliz Ozuna '26

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Faculty Sponsor: Professor Kathryn Weglarz

The Impact of the Rapid Expansion of Purple Loosestrife on Native Species

An invasive species is an organism that causes ecological or economic harm in a new environment where it is not native. In our research we looked at the invasive species purple loosestrife and the native species broad-leaved cattail. Our methods included researching on our own using scientific research sources, we then used these sources to create an annotated bibliography. We took information from all of our research to create a hypothesis: if in areas where both species are present there will be a larger population distribution of purple loosestrife. Then we took citizen data from iDigBio and GBIF, which are location tracking apps, to see the distributions of each of our species. Next, we combined the data and mapped it out on QGIS. We used our combined data to also create a google sheet which we used to create a scatter plot and a range of best fit from the cleaned data of both species. Lastly, we put all our data into VassarStats to find the rate of expansion for each of our species. The results we found did not support our hypothesis. Our research has shown that in areas where both are present, purple loosestrife has a large population distribution and is expanding at a fast rate. Our findings highlight the impact of invasive species on native ecosystems and the importance of monitoring their populations.

Paige Walsh '26, Danford Raphael '23, Caitlyn Chu '25

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Faculty Sponsor: Professor Kathryn Weglarz

How Brassica nigra is becoming a more dangerous invasive species than Alliaria petiolata

Alliaria petiolata and *Brassica nigra* are both non-native species that were brought from their native countries to the United States, *Brassica nigra* in the 1700s and *Alliaria petiolata* in the 1800s. Both of these species have proven to be invasive, exhibiting harmful patterns of growth that interfere with plants native to the United States. We hypothesized that, while *Alliaria petiolata* has been known to be a harmful invasive species, the growth exhibited by *Brassica nigra* is troubling. *Alliaria petiolata* and *Brassica nigra* are similar species, however, the earlier introduction time and faster growth rate of *Brassica nigra* are proving to be more harmful to native species. This hypothesis was supported by our findings and we discovered that *Brassica nigra* has a more growth rate, and occupies more land than *Alliaria petiolata*.

Isabella Catao '24, Charlotte Haley '24

Oral Presentation

Faculty Sponsor: Professor Kathryn Weglarz

Seasonal Effects on Pieris Rapae's Wing Melanization in Native and Invasive Populations

The Cabbage White Butterfly (*Pieris rapae*) is found across the world however, their native population originates out of Europe. We will observe how *Pieris rapae* butterflies introduced to North America will respond seasonally in comparison to the native *Pieris rapae* European butterflies. There is currently little comparative research between native and invasive populations of *Pieris rapae*, therefore in this research we will study how seasonality affects the degree of melanization on the wing apex of native and invasive summer butterflies (July, August, September) compared to native and invasive spring (March, April, May) butterflies. It is shown that melanization is increased in colder temperatures compared to those in warmer temperatures. Our research is beneficial in piecing together the life history of *Pieris rapae*, its evolutionary capabilities, and if the invasive population experienced a bottleneck or founder effect when the native population emigrated. We expect that butterflies of the spring generations will have distinctly darker apex patches compared to those of the summer generations in North America compared to Europe. We are using samples of *Pieris rapae* collected from iDigBio.com and comparing them to gather accurate data and patterns relating to their melanization patterns. We will use the location, and date collected which will allow us to gather accurate information about the *Pieris rapae* during different seasons. By using iDigBio we can successfully sort and compare our information across the different populations of butterflies in both seasons. The distribution of the samples makes it so we have more accurate information of these butterflies to support our research.

Jason Brewster '25, Deziray Nieves '25

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Faculty Sponsor: Professor Kathryn Weglarz

Water chestnuts versus curly-leaved pondweed: which will spread the fastest? Place your bets!

Our group studied two invasive species, the Water Chestnut (*Trapa natans*) and Curly-Leaved Pondweed (*Potamogeton Crispus*). Both are aquatic plants that spread swiftly and leech on local plant life. We hypothesized that the pondweed, which flourishes in low-light areas, will expand at an equivalent rate to the Chestnuts, which block out light when densely gathered at the surface. Using citizen data from iDigBio and iNaturalist, we compared the distribution area for both species from their introduction to the present. The data revealed the discovery of both invasive species and showed locations where the species started. Over several years, these species have grown and taken over large bodies of water across the Northeast United States. Contrary to our hypothesis, the Curly-Leaved Pondweed far outnumbered and spread faster than the Water Chestnuts. We postulate that the water chestnuts benefit from the curly pondweed, so as the number of pondweed increases, the water chestnuts follow. The rise in the pondweed would be because the species can survive colder temperatures while the water chestnut does not. In our graphs comparing the two species, as the colder weather comes, the water chestnut population decreases, and the pondweed remains as the species is able to live through the drastic temperature change.

Austin Lourake '24, David Vasilchenko '26, Desmond White '25, Max Wickersham '25 59

Faculty Sponsor: Professor Kathryn Weglarz

Stink Bugs Inevitable Destruction of the Fresh Fruit Industry

The Brown-Marmorated Stink Bug, *Haylomorpha halys*, is an incredibly fast-growing, invasive species of hard-shelled bugs, introduced to the North Eastern United States in the early 1990s. Over that time, the stinkbugs have expanded to the west coast, and have lawmakers, farmers, and scientists worried about their effect on the grape industry. Our group of data analysts hypothesized that the rapid expansion of Brown-Marmorated Stink Bugs would result in the decline of the Concord Grape, (*Vitis labrusca*), population. We used several methods to prove this hypothesis, such as mapping analysis, population studies, and scientific journal research. Through our population analysis and data research, our group found that stink bugs have little effect on population distribution, but their spread poses a significant threat to the fresh fruit industry.

Annalise Cramer '23 6

Faculty Sponsor: Professor Mao-Lun Weng

Selective Pressure of SARS-CoV-2 Spillover into Pets

The SARS-CoV-2 pandemic is a complicated and crucial topic in modern day biology. The future development of the pandemic depends on the evolution of new variants. Previous coronaviruses have a strong history of animal reservoirs and zoonotic spillover, and one leading theory on the emergence of SARS-CoV-2 is by zoonotic spillover from bats. In this study, we construct phylogenetic trees and calculate dN/dS ratios for sequences of SARS-CoV-2 in humans, domestic cats, and domestic dogs. We explore the possibilities of SARS-CoV-2 evolution within animal hosts via comparison of phylogenies and quantifying selective pressure of the various hosts. We find that the phylogenies of structural genes compared to non-structural genes were consistent with each other, suggesting minimal intraspecies evolution. Instead, we found the viral strains were clustered by geographical location and date of sample collection, suggesting that as the virus spilled over it was not under selective pressure. Analysis of dN/dS ratios reveals no significant selective pressure across both structural and non-structural genes. These results suggest that SARS-CoV-2 may not be evolving differently in domestic cats and dogs than in humans, and further studies are necessary to explore other animal species.

Jordan Adadevoh '23

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Faculty Sponsor: Professor Robin White

My Experience within the MGB MLS program

The Mass General Brigham Medical Laboratory Science Program is an accelerated 10-month 4+1 post-baccalaureate program located on the Brigham and Women's Hospital campus to provide schooling and laboratory training for Medical Laboratory Scientists (MLS). MLS students enrolled in the MGB MLS program are educated on the theory and performance of procedures and tests each clinical laboratory utilizes. Students in the program will progress through 6 months of didactic training and then are assigned to different Mass General hospitals to undergo four months of clinical training. At the completion of the program, students are eligible to sit for the American Society of Pathology Board of Certification exam. My experience with the program has been wonderful, teaching me about the numerous machines utilized within the laboratory to test results and provide more information to properly diagnose patients based on the fluids within their bodies. I've been able to tour different sections of the laboratory at the Brigham and Women's Hospital, make connections with the various leaders and managers within that space, and even been exposed to their tutelage and minds when they lecture for us as guests to help understand the more difficult topics within laboratory routine. They understand the dedication it takes to become a generalist in all the specific areas of the laboratory and are patient with our understanding as a result, which makes things easier to absorb even in this accelerated course. This poster presentation will showcase my experience within the program thus far, going into detail about the four facets of the medical laboratory: Chemistry, Microbiology, Hematology, and Blood Bank.

Skye Chalmers '23

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Faculty Sponsor: Professor Robin White

Novel Scopolamine-induced Alzheimer's Disease Model in Drosophila melanogaster

Alzheimer's disease (AD) is a neurodegenerative disorder that affects roughly 11% of Americans over the age of 65. So far, treatment has only been successful at reducing visible symptoms of AD, but unfortunately lack the capacity to slow or stop the progression of disease. *Drosophila melanogaster* have proven to be successful research models of neurodegeneration in the brain; they possess a nervous system that significantly resembles that of humans, most importantly the existence of the blood brain barrier (BBB), which is an important structure to consider for modeling mechanisms of treatment delivery across the BBB. It has been used to model neurodegenerative diseases such as Parkinson's Disease and other neurodegenerative diseases of the central nervous system (CNS). Since the literature supports treatment with scopolamine in mouse models induces Alzheimer's-like clinical presentations, we propose that a scopolamine-induced AD in a *Drosophila* model would sufficiently mimic the human neuropathogenesis of AD. Here, wild-type *Drosophila* are to be treated with scopolamine to induce Alzheimer's-like disease progression. Male and female cohorts will be followed post-scopolamine treatment to monitor its effects on the nervous system and the progression of the disease model. Rapid Iterative Negative Geotaxis (RING) assays and courtship assays will be performed to continually monitor neurodegenerative changes in motor function and short-term memory, respectively. We predict that if scopolamine-treated *Drosophila melanogaster* is to be a successful model of AD, that the treatment cohorts will express a progressively decreasing motor function as well as a reduced ability to maintain short-term memory loss when compared to controls.

Alexa Bergeron '23

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Faculty Sponsor: Professor Robin White

Characterization of a Concussion Model in Drosophila

Characterization of a Concussion Model in Drosophila

Concussions and Traumatic Brain Injuries (TBI) affect millions of people in the United States every year. Some go undiagnosed, untreated, mistreated, or become repetitive. This leaves many with increased risk of neurodegenerative disorders such as CTE (Chronic Traumatic Encephalopathy), Alzheimers, and Parkinson's Disease. Many doctors and researchers struggle to treat and cure such diseases due to unknown reasoning of human TAU build up. This can only be seen in the brain after death. By experimenting and creating an animal model for repeated concussion we can see the potential effects on Drosophila by testing behavior, function, and through brain dissection. To model concussion the flies were separated into groups and the TBI machine was used to inflict 3 concussions over a seven day period. After each concussion the RING method was used to test behavior and function of the flies as well as before the concussion. After the concussions were complete the brains were dissected and fixated for brain imagery for visual analysis. Thus far the results have indicated that the flies survival rate is about 50% when receiving 3 concussions and their behavior and function is negatively affected. The rest of the results for RING and brain imagery will be presented at CURCA. As an athlete that has received multiple concussions myself, it motivates me to work towards the goal of creating this model. This model could open new doors on how to understand concussions and the effects of them much better than we did prior by seeing it through an animal and help prevent neurodegeneration.

Chemistry & Physical Sciences

Poster No.

*** Luke Mathewson '23**

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Faculty Sponsor: Professor Frank Giuliano

The Physics of Baseball: The Next Generation Science Standards and America's Greatest Pastime

Learning science in the context of real-life situations has long been established in science education research. For students who take an interest and/or actively engage in sports and athletics, learning science often becomes more meaningful when applied to specific sports, games, and related activities. While many curricula, lessons, and activities have been developed that relate science concepts to specific sports, little work has been done to examine the relationship between specific science content standards, as outlined in the Next Generation Science Standards (NGSS) and Massachusetts Curriculum Frameworks (MCF) for Science, Technology, and Engineering (STE), and specific aspects of a variety of sports. This project examines a select number of those standards within the physical sciences with regard to specific aspects of the sport of baseball. Topics include the conservation of energy and energy transfer, forces and motion, wave properties, and information technologies. The standards, specific physics concepts, and corresponding phenomena and examples from baseball are provided, along with a video recording illustrating some of those concepts.

Jenna Glinka '23

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Faculty Sponsor: Professor Frank Giuliano

Coronavirus Pandemic Impact on Science MCAS Scores

The Science and Technology/Engineering (STE) Massachusetts Comprehensive Assessment System (MCAS) test is based on the four major content areas of the curriculum framework of Earth and Space Science, Life Science (Biology), Physical Sciences (Chemistry and Physics), and Technology/Engineering. STE MCAS tests are administered in grades 5, 8, and 9/10. Students must earn a passing score on MCAS tests as part of the state requirements to graduate. In spring 2020, the world was overcome by the coronavirus pandemic, resulting in national lockdowns. Many schools throughout Massachusetts were not prepared or able to equip students with the resources necessary for the sudden transition to remote learning. The 2020 MCAS testing was subsequently cancelled. The Board of Elementary and Secondary Education approved modified graduation requirements for Classes of 2020-2023. Eighth grade MCAS test scores were retrieved from the Massachusetts Department of Elementary and Secondary Education for 2019, 2021, and 2022. Median household income was retrieved from the US Census Bureau for each county. Our analysis suggests a loss of learning during the pandemic. Every county reflects a decrease in pass rates for post-pandemic years. Counties with the lowest MCAS test scores are also the counties in the bottom 50% for income. Pre-pandemic test scores suggest low-income has been an ongoing drawback for school districts. It is important to identify if there was loss of learning during the pandemic and how to better support students. The trends identified in this study can raise awareness regarding the relationship between income and achievement. This awareness can, in turn, help educators and state education officials prepare future generations for the test or address changes to the standardized testing, such as adjustments to Competency Determination requirements or funding for student resources.

Brianna Toomey '23, Althea Smith '24

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Faculty Sponsor: Professor Christopher Masi

Using Gas Chromatography to Separate and Identify Components of Clove Oil

Organic chemistry techniques can be used to extract natural essential oils from spices, specifically clove oil. Clove oil is composed of several compounds, the most abundant of which, as learned by previous researchers, are eugenol, eugenyl acetate, β -caryophyllene, gallic acid, and ellagic acid.[1,2] The purpose of this research is to separate and identify these components of clove oil using gas chromatography. This technique uses helium gas to push a sample injection of the material through a heated column, causing the sample to change from liquid to vapor inside the column and measuring the amount of time it takes the sample's components to evaporate and travel through. This time is referred to as retention time as it is a measurement of how long the sample was retained within the column. Identification of peaks at specific retention times can be used to confirm separation of materials within a mixture. Measurable peaks for each individual component were first identified using mixtures of methanol, temperature ranges, and adjusting flow rates. This confirmation then allows a combined chromatogram to be created of all the components of clove oil, to see how retention times between components compare. Using this information, the goal is to create a mixture that mimics the peaks produced from the clove oil sample, which could be stimulated in an organic chemistry lab for students.

*** Daniel Lanctot '23**

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Faculty Sponsor: Professor Karsten Theis

The Chemistry of Ultraviolet Polymerization -- Free Radical Polymerization in a Urethane Acrylate System

A majority of the chemical industry's output is polymer and plastics. The polymerization process, turning small molecules (monomers) into large ones (polymers), has four stages: initiation, propagation, chain-transfer, and termination. In my project, I am using UV light in combination with a photoinitiator to initiate the reaction. The propagation process includes the chain reaction with different monomers and oligomers in the formulation, with cross-linking occurring in the presences of multifunctional monomers. The purpose of this research is to demonstrate how physical properties of a polymer are affected by choice of monomers and oligomers in the formulation. Different monomer with varying number of functional groups or the molecular weight of different oligomers will change the final product of polymerization. To compare the different polymers, I will measure tensile strength, hardness, water absorption, depth of cure, and adhesion to different substrates. Using the same fundamental radical reaction, the choice of monomer and its functionalization leads to a variety of polymers with unique properties matching the requirements of the potential customer.

Environmental Science

Poster No.

Quinnten Vescovi '24, Ashley DeMio '23

Oral Presentation

Faculty Sponsor: Professor Lauren DiCarlo

Observing Native wildlife in High & Low traffic areas of Westfield & Barre MA

The goal of this project is to determine and identify which Massachusetts wildlife species prefer high or low trafficked areas. We used game cameras in three different locations around Barre and Westfield MA, as well as recorded animal tracks in order to survey which wildlife walked through each area. This data will identify which areas receive a high or medium amount of animal traffic and could be used for future wildlife management and protection projects. We accomplished this by setting up two cameras at three different locations throughout Westfield and Barre, with each location having a high traffic area and a low traffic area. We hypothesize that we will find less animal activity in the high traffic areas and more animal activity in the low human trafficked areas. We also hypothesize that predators and prey will prefer opposing trafficked areas based on hunting and shelter preferences respectively.

Katrina Bingham-Maas '23, Noah Tyler '23

Oral Presentation

Faculty Sponsor: Professor Lauren DiCarlo

Invasive Plant Survey on the Little River in Westfield, MA

We conducted an invasive plant survey of the Little River area on the Westfield State University property in Westfield, MA. Invasive plants are non-native plants that are introduced to an area. After introduction, these plants can outcompete native plants, decrease biodiversity, cause soil erosion, and a loss of habitat. It is important that we survey where these plants are located so that we will be able to remove them at a later date. Our survey consists of counting how many invasives there are and how many native woody species there are in a circular plot 10-meter in diameter, so we can determine a density of the invasive relative the number of native species that are also located in the plot. We have three plots set up along 7 transects that are perpendicular to the river which will help us determine if these plants are more commonly found closer or farther from the river. We hypothesize that we will find a higher density of invasives near the river, as seeds can be transported by routinely flooding waters.

Casey Moore '23, Whitney Scott '23, Evan Khordoc '23

Oral Presentation

Faculty Sponsor: Professor Lauren DiCarlo

The Impact of Dams & Their Removal on Water Quality In the Westfield River Watershed

The Westfield River begins in the Berkshires, flowing southward through 29 communities until it enters the Connecticut River located in Agawam, MA. Around 80 miles of the Westfield River's main branches are designated as a National Wild & Scenic River but the watershed includes 517 square miles of rivers, streams, lakes and ponds. The Westfield River provides critical habitat for wildlife including rare species, it's also one of the best cold water fisheries in the Commonwealth. Westfield's watershed consists of about 45 standing dams, many of which are in disrepair. When a dam gets removed, it results in the sediment buildup behind it to wash downstream with the water. If this sediment buildup contains an abundance of contaminants, then those will also end up downstream. Dams are also a major barrier for migratory aquatic life, mostly fish species which are extremely important in the food web as food sources for both wildlife and humans. We want to see how different the water quality will test before and after a standing dam compared to water at a previously removed dam. At 8 locations in the Westfield River Watershed, we will be testing for phosphate, nitrate, PH, dissolved CO₂, dissolved O₂, temperature, ammonia, and conductivity in measured ppm. We expect to find more contamination in our testing sites above the dams than below or at locations where dams that have been removed. Our primary research question is: Are there higher levels of aquatic contaminants at standing dams than at removed dams?

Jacob Towsley '23

86

Faculty Sponsor: Professor Tim Parshall

Winter Survival of the Invasive Hemlock Woolly Adelgid

Eastern Hemlock (*Tsuga canadensis*) is a foundation species distributed throughout New England forests. It is commonly found in the understory and provides a unique habitat for a wide variety of vertebrate and arthropod species that rely on the tree for food, shelter, and reproduction. Eastern Hemlock is in decline due to two non-native pests, the Hemlock Woolly Adelgid (HWA, *Adelges tsugae*), and the Elongated Hemlock Scale (EHS, *Fiorinia externa*). Both HWA and EHS cause defoliation of the hemlock's needles. These two pests are currently limited by minimum cold temperatures and are unable to sustain a population in the northern part of the Eastern Hemlocks range. The last 100 years have been the warmest in recorded history and temperatures are expected to continue to rise, this creates a general northward shift in species preferred habitat and has caused the spread of species that are limited by cold temperatures. In order to see the impacts of the two pests in western Massachusetts, 40 sites were sampled in the fall of 2008 and revisited in the fall of 2022. Observations of an altitudinal range expansion for both pests were noted. The 2008 infestation saw HWA at elevations of 135 meters, the current infestation saw both HWA and EHS at elevations up to 530 meters before a sharp decline in infestation. To better understand the potential range expansion of the pests in western Massachusetts, temperature loggers were deployed at 10 representative sites to record over-winter temperatures from December through February. The 2022-23 temperatures were compared to the 2008 temperatures to see the impact of warming. The 10 sites were revisited in March and samples were collected to determine the mortality rate of HWA and EHS. Using a combination of statistical methods and field sampling I am analyzing the range expansion of HWA and EHS.

Health Sciences

Ethan Gregoire '24

Oral Presentation

Faculty Sponsor: Professor Karen Sladyk

Caffeine | Anxiety - The Need for Accurate and Precise Research

Does high caffeine intake lead to worse mental health outcomes for college students? The purpose of this research study is to explore the relationship between caffeine intake/addiction and anxiety for college students. An online survey was created and sent out to college students. This research study occurred at a public 4-year state university in New England. The survey gathered 21 responses and attained significant results for participants who reported energy drink use and caffeine intake rationales ($P=0.023$). Coffee intake also had high correlations to the signs and symptoms of anxiety ($P=0.026$). Lastly, the literature on caffeine intake and anxiety was reviewed and discussed. Interesting and unexpected outcomes were analyzed and discussed in the studies post hoc.

Movement Science

Poster No.

Stephanie Scoville '24

50

Faculty Sponsor: Professor Brian Selgrade

Effects of Growth Mindsets on Academic Performance in Kinesiology

There is limited research surrounding the impacts of having a growth mindset in kinesiology. Having a growth mindset means someone sees challenges as something that they can grow and learn from. While someone with a fixed mindset would see challenges as something that might break down their confidence or make them look/feel inferior to their peers. The purpose of doing a study around this subject could give us an insight on the correlations between growth mindset and students success in Kinesiology. We predict that someone who has a growth mindset would have more success in the class. We also predict that mindsets are going to be favored more to the fixed side when considering the math category. Throughout the semester we had the students take 3 surveys. We used a modified ITI-SS, with additional questions to understand the student's specific mindsets towards math, writing and computer skills. We found, students' general mindset decreased from 4.05 in the initial survey to 3.76 in the final survey, although this difference was not significant. Contrary to our hypothesis, mindsets towards computer skills and writing significantly decreased, indicating that students drifted toward a fixed mindset. At the end of the semester all mindset scores except for computer skills were above 3, indicating that students still had more of a growth mindset for each category. Math mindset was significantly lower than general mindset pre-semester, supporting our second hypothesis. These data indicate students' mindsets were more fixed towards math and computer skills than in general.

Nursing

Maguire Tierney '23

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Faculty Sponsor: Professor Charleen Diggins

Monitoring Hand Hygiene Compliance of Health Care Workers

Comparing the efficacy of hand hygiene monitoring systems compared to direct monitoring for increasing compliance in the hospital setting can help reduce the incidence of hospital associated infections (HCAIs), cross contamination, and reduce overall costs. This research aims to identify the most efficient way of monitoring hand hygiene with respect to clinician autonomy and buy-in from those in leadership roles. Initiation of electronic monitoring systems (EMS) aims to solve the problem of HCAIs by decreasing hand hygiene noncompliance, the primary measure of prevention. EMS consists of sensors, alcohol/soap dispenser monitors, and badges. It will detect use of sinks and sanitizer stations upon entry and exit of patient rooms and record it to a database. Research in this study consists of information recorded in these data bases, compared to direct observation data. Results from these studies have shown that EMS is successful in promoting and improving hand hygiene compliance. These results imply that EMS is entirely accurate and accounts for specific instances of hand washing that arent monitored, such as desk sanitizer and bathroom sinks. It also does not account for instances where the user is not standing directly in front of the dispenser for a certain duration of time; aka "fly-by" events. These systems implement a culture change to hospital units and deny workers the autonomy and trust to utilize their better judgment and integrity. Additional education and tools should be developed and utilized to promote prolonged and significant change in behavior and compliance.

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Faculty Sponsor: Professor Joan Kuhnly

Safe Staffing Saves Lives: How the Nurse-Patient Ratio Impacts Patient Outcomes

Within recent years hospitals and other nursing facilities worldwide have experienced a shortage of nursing staff. This project focuses on the effects of proper staffing of skilled nursing personnel on patient outcomes such as satisfaction and safety in hospitals that have limits on the nurse to patient ratio. Current research suggests that staffing shortages can have a number of negative effects on both staff and patients. Hospitals are presumed to be a safe healing environment, but unsafe ratios can lead to patient injury and can even result in death. The research will be qualitative for patient satisfaction and quantitative for safety. This project is a proposal of how safe staffing ratios could be implemented at a hospital and what would be entailed in that process. We expect to find that patient satisfaction increases with more staff and safety outcomes would improve. We also infer that proper ratios would decrease the rates of burnout for bedside nurses. These conclusions are important because they ensure a safer and more positive patient experience during their stay in the hospital, and improve trust in the healthcare system. It also may prevent nurses from leaving the bedside, which is a factor contributing to the nursing shortage in hospitals.

Anna Salter '23 **5**

Faculty Sponsor: Professor Joan Kuhnly

Are Non-slip Hospital Socks Truly Non-slip?

Falls in older adults are detrimental events that lead to poor health outcomes and decreased quality of life. Falls for hospitalized clients are a common yet multifaceted adverse event due to physical and environmental factors. Fall prevention strategies include proper footwear, patient education, use of assistive devices, exercise, medication review, and environmental adaptation. Using non-slip socks on fall-risk clients in healthcare establishments is standard practice for fall prevention. This type of footwear has a rubber or synthetic thread that aims to provide friction to aid with ambulation. However, current evidence has shown that these non-slip socks do not decrease the number of falls in hospital settings. Studies that have a decrease in fall rates show no correlation with the use of non-slip socks. During a clinical internship at a long-term care facility in Western MA, current evidence and clinical interactions with clients and staff identified the need for non-slip sock evaluation and safer footwear implementation to decrease the risk of falls. The staff informally reported veteran falls related to non-slip sock use and desired an alternative product. Samples of a safer non-slip sock alternative were obtained from the company Posey. Quick Dry Slippers by Posey were recommended for their rubber sole and comfortable sock material that may increase fall safety and client compliance. Staff education on current evidence and the new product will be provided as part of the pilot program using the new footwear and future monitoring is planned.

**Kerry Greenough '24, Jasmine Terounzo '24, Michaela O'Connor '24,
Bridgette McAndrews '24**

26

Faculty Sponsor: Professor Joan Kuhnly

Medical Care and Psychiatric Care: One and The Same?

We are exploring the question: In medical patients with psychiatric disorders, how does being placed on a medical-surgical floor compared to being placed on a psychiatric unit influence staff and patient experiences throughout admission? We have decided to dive deeper into this concept due to our own experiences at our jobs as nurse's aides, as well as at clinical for school. Oftentimes, patients with psychiatric disorders are placed on medical-surgical floors due to medical comorbidities, or to the simple fact that there are no available placements at the proper psychiatric facilities. We are curious as to whether having a non-psychiatric nurse care for these patients is therapeutic. We have seen medical-surgical nurses with a "not my problem" mindset when it comes to dealing with patients' mental health. Some feel their job is to care only for the physical aspect of the patient rather than their psychological state too. Based on current evidence, our proposal is to develop a new unit in which nurses are trained with medical-surgical skills as well as psychiatric care. We hope to improve the experience of nurses providing care along with the quality of care patients are receiving.

**Jacob Butler '24, Godfrey Macadangdang '24, Lydia Sullivan '25,
Max Pechulis '25, Emily Evans '24**

49

Faculty Sponsor: Professor Joan Kuhnly

Is Weed The New Antiemetic?

Cancer patients who undergo chemotherapy often experience nausea, vomiting, loss of appetite, and discomfort. Weight loss is a significant symptom of cancer and the additional side effects produced by chemotherapy make it difficult for patients to replenish the loss of nutrients. Combined with chronic pain, these symptoms can make cancer treatment a constant struggle. Many cancer patients are exploring newer and alternative forms of treatment for chemotherapy-induced nausea and vomiting (CINV). Medical cannabis was found to alleviate chronic pain as the main issue in cancer patients, but they have also found it to be effective in alleviating CINV. Yet, not many physicians and healthcare workers have the knowledge of this new form of medicine and many others still hold strong negative beliefs about the substance even with its legalization in recent years. With the given evidence, we find that an evidence-based project on this topic would help provide patients with one form of alternative treatment that might benefit them if current, standard antiemetic treatments are ineffective.

This evidence would be beneficial to the healthcare team of the oncology unit, have medicinal cannabis as a potential option to interested patients, provide patient-education on its use, and explore the variety of ways it can be distributed and used by the patients. It may also provide insight into other healing properties it may contain and aid in reducing stigma related to medicinal cannabis usage. Patient comfort is extremely important and by relieving CINV in cancer patients going through chemotherapy, it will lead to a better quality of life.

Morgan Wichmann '24, Lily Spencer '24, Cara Derby '24, Kelly Hester '24

44

Faculty Sponsor: Professor Joan Kuhnly

Saving Lives at the Bedside: One Report at a Time.

Change of shift report is an important process that happens at least twice a day in a hospital setting. This process involves the previous nurse and the new nurse reviewing vital patient information. This information includes contents such as diagnosis, medication administration, and assessment points. This process historically has taken place at the nurse's station but current evidence supports moving the report to be completed at the patient's bedside. Some of the positive benefits of bedside reporting are a decrease in patient falls and medication errors. Therefore, the purpose of this project is a proposal on how bedside reporting could be implemented in an agency that currently practices nurses' station reports.

Implementing bedside reporting will be evaluated using qualitative analyses of pre and post-pilot study questionnaires of the nursing staff and patients to determine what changes may need to be made to continue this evidence-based practice.

Mackenzie Burgoyne '24, Kelsey Wresien '24, Elyse Finerty '24,

45

Maddyson-Taylor LePouttre '24

Faculty Sponsor: Professor Joan Kuhnly

Get Shredded at the Gym or Shred Your ACL

In recent years, ACL injuries have had a higher incidence rate among high school athletes as sports have become increasingly competitive. These career-ending injuries have both physical and mental repercussions that can take a toll on the athlete's life. To tackle this issue this project proposes to hire a strength training coach to run lifting programs for teams at Templeton High School in hopes to reduce the rates of ACL injuries. This injury is very prevalent and has begun to become normalized within the athletic community, even though it is not normal and should not be viewed as so. Current evidence supports that teaching coaches and athletes about the importance of strength training and implementing it in the athletic program can be used to prevent ACL tears from occurring. This project proposes a quantitative approach by measuring the hamstring-quadriceps activation ratios during closed kinetic chain exercises, trunk endurance, coactivation muscle ratios, knee movements, peak knee valgus, and knee extensors and flexors strength. All of these measurements are significant to our research, as these play key roles in ACL injury. Assessing whether or not strength training adjusts the impact of these factors and reduces ACL tear risk, answers our question. From our research, we expect to see that strength training will decrease the rate of ACL tears, increasing the longevity of athletes' careers and overall well-being. The training programs can be implemented in sports teams across all genders and ages, building a muscle strength foundation, and minimizing the chance of injury.

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Anna Salter '23, Ashley Schabacker '25, Ella Sherman '25, Kelsey Spiller '25,
Kaitlyn Troy '25, Abby Work '25, WSU Nursing Students**

110

Faculty Sponsors: Professor Joan Kuhnly and Jean Prast

Benefits of Professional Conferencing

Attending professional conferences promotes lifelong learning of research, current evidence and nursing practice. Modeling this behavior by including student attendance at a professional regional conference sets the stage for continued scholarship as well as begins networking opportunities. Funding through CURCA was granted for two faculty and 9 nursing students to participate in an annual scholarship conference hosted by the local chapter of the international nursing honor society, Sigma Theta Tau. Students actively critiqued research presentations and networked with other nursing students from Western Massachusetts during a day long in person conference. Student reflections will be analyzed to identify the benefits of professional conference day participation and will be reported. These results should hopefully support future attendance and participation of students.

Ashley Schabacker '25

4

Faculty Sponsor: Professor Jennifer Pappas

Exploring Community Resources: Supporting Rural Wellness

Improving overall wellness is an essential goal for community health professionals and maintaining a healthy population can improve overall health outcomes. In rural communities, lower populations can lead to a decrease in access to health and support services, raising the risk for poor outcomes, education, and knowledge about health information and healthy behaviors. By looking at community support services for the Hill town area of Western Massachusetts, it can be determined if these services improve overall wellness to those living in low-income areas. The Village Closet located in Huntington, Massachusetts, provides essential resources, support groups, and resources for families in order to promote reaching out for help, and to decrease the stress for parents of young children. By providing support to parents and families this decreases the stress and worry for parents allowing them to have more sources of support to lean on in times of need. Decreasing stress levels of families supports their Social Determinants of Health in the Community and Economic context supporting the Healthy People 2030 goal of “reducing the proportion of people living in poverty.” Improving the amount of resources and sources of support in rural and low-income areas have allowed a decrease in stress to families, an increase in community connection, and an improvement in overall health education and wellness.

Alyssa Bukowski '25

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Faculty Sponsor: Professor Jennifer Pappas

Emergency Preparedness for Natural Disasters

Emergency Preparedness is steps and actions that you can take prior to disaster to ensure you can be more safe before, during, and after disasters. Natural disasters are one type of disaster and they are unexpected. Fortunately because of emergency preparedness we have a head start. When these unfortunate disasters occur people tend to focus on the aftermath and what we can do to help afterwards, but by educating people we can teach that before these disasters are just as important. Educating people on emergency preparedness and natural disasters can help reduce fear, anxiety, and especially losses that tend to accompany these natural disasters. These losses could be something personal, like property or belongings, or they could be something like someone's life. It is important to know how to prepare for these emergencies and for communities, families, and individuals to partake so that we can try to reduce the risk of loss as much as possible.

Hannah Stringer '23

29

Faculty Sponsor: Professor Jennifer Pappas

Improving TB Medication Adherence Through Language

Tuberculosis is a harmful contagious bacterial infection that a fourth of the world is at risk for spreading with cases high in developing countries. Many foreign-born individuals who move to the United States will test positive for TB. Whether you are actively having symptoms (active TB) or it is lying dormant in your lungs (latent TB), treatment includes taking either Rifampicin or Isoniazid for a minimum of 6 months or a maximum of 9 months. Medication adherence is difficult due to the long consistent course of treatment. Low medication consistency leads to the spread of TB and an increase in drug resistance. Studies show many different risk factors contribute to this non-compliance such as lack of transportation, cost, and lack of education. It has been directly observed at a health department in Western Massachusetts that one of the main causes of hesitancy and decreased medication adherence is a language barrier. When trying to educate a patient on their diagnosis and the benefits of treatment, translators have difficulty translating the medical jargon into a comprehensible conversation. If the information were to be broken down into simpler terms and translated into the patient's native language, this would help the patient with making an educated informed decision about their medical care. Creating a pamphlet for the health department to give to individuals about where they can find information in their language or whom to contact with questions will be implemented.

Sarah Tanner '23

53

Faculty Sponsor: Professor Jamie Rivera

Workplace Culture

In the healthcare setting, work culture determines how medical, nursing, and other professionals work together in the pursuit of achieving organizational goals -- whether they work in clinics, hospitals, health centers, and other health institutions. A literary review was conducted to determine if workplace culture effects patient satisfaction and staff engagement. The results established that workplace culture is an important topic for staff members and patients. Healthcare workers want to work in a place they are appreciated and treated well. Patients want to receive treatment where the healthcare teams work well together. Negative workplace culture can be caused by burnout, workplace bullying and so much more. There are many ways to prevent the causes of negative workplace culture. Creating a positive workplace culture has positive effects on nurses and patients including better patient outcomes. A positive workplace culture is essential to healthcare. Future research should be conducted to conclude better ways to improve workplace culture.

Rhenna Barry '23

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Faculty Sponsor: Professor Jamie Rivera

The Effects of Thiamine Supplementation on Patients with Heart Failure

In past years, thiamine has been prescribed to patients with heart failure to help ease symptoms and promote the delay in the progression of the disease. Thiamine is an essential vitamin that aids in the synthesis of ATP and energy production. It has been shown that patients with heart failure tend to have unbalanced energy consumption levels. The intent of prescribing thiamine has been to balance energy consumption as micronutrient imbalance can lead to decreased myocardial energy production. Many studies have denied the support of thiamine supplementation; however, it can help promote cardiac function and improve symptoms in patients with heart failure.

Grace Looney '23

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Faculty Sponsor: Professor Jamie Rivera

“I Don’t Feel Good” Where to Go and Why: An Educational Intervention to Decrease Walk In Wait Times

Background: Many of the patients at the Holyoke Health Center (HHC) come into the walk-in center seeking care that should be managed at a different facility.

Objective: This project aims to evaluate the effectiveness of educating patients on when they should go to the walk-in center, emergency department (ED), or their primary care provider (PCP). With this education we aim to decrease the overall wait times seen in the walk-in.

Methods: An educational poster was implemented in both English and Spanish into a television slideshow that appears in the waiting areas throughout HHC. This poster reviews which facility one should seek healthcare depending on the current situation. We look to compare data from previous years with data gathered a year after implementation. A scholarly review was done to assess how to decrease overcrowding in the ED and ways to improve this issue.

Results: This project is currently underway, so the results are inconclusive. We predict that a year after implementation, the incidence of these visits will decrease, decreasing wait times at the walk-in. After conducting a scholarly review, research suggests that there are varying reasons one chooses the ED over their PCP. This project focuses on education as a way to combat this ongoing issue. It also suggests that more research needs to be done on the impact education has on the number of inappropriate visits to these facilities. Implications: This education can help overall patient flow throughout the walk-in center.

Morgan Burnham '23

47

Faculty Sponsor: Professor Jamie Rivera

Medical Errors and Decreased Vigilance Among Night Shift Nurses

Background: Many night shift nurses can suffer from being tired during shifts for many different reasons. Trying to eliminate errors that can occur from sleepiness is important. Purpose: The purpose is to find if there is a correlation between working a night shift and an increase in errors or psychomotor function.

With these findings we can find ways to decrease the potential risk for errors and also increase wakefulness during the shift. Methods: A poster was created to explain the risks of sleep deprivation, specifically in night shift workers, and also shows potential ways to increase wakefulness during the shift and sleep during the day. Research was used to compare the differences between night shift workers and daytime workers and how their shift time affected these errors and psychomotor function. Results: These studies showed that medical errors were increased and psychomotor function was decreased in night shift workers. It was found that disrupting your circadian rhythm may increase mistakes made. These results also increased the more hours and days that you work. Educating night shift workers on the increased risk for errors and a decrease in psychomotor function can help bring attention to the problem and can start a conversation within the units on how to keep their staff awake and alert.

Conclusion: Education is the most important tool to help combat sleep deprivation that is associated with errors and psychomotor function. Knowing the risks can help units and individuals create a plan to increase wakefulness throughout a shift.

Rawan Ebrahim '23

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Faculty Sponsor: Professor Jamie Rivera

Interpreting Modalities and their Effect on Patient Safety

Healthcare facilities are being met with increasingly large populations of non-English speaking (NES) and limited English Proficient (LEP) patients. This warrants an increase in the usage of interpreting services. Language barriers between NES and LEP patients and the health care practitioners that care for them must be overcome to maintain patient safety. Different modalities of interpreting are used to meet this demand, however, not all are considered “best practice” in terms of ensuring patient safety. Some modalities are commonly seen in practice because they not only provide ease of access but come with a lack of research on risks associated with using certain interpreting modalities. This study examines the certified-in person and ad hoc interpreting modalities in the context of the health care setting with an emphasis on patient safety. This is done through the lens of existing standards of practice that professional health care interpreters are bound by. The National Council on Interpreters in Health Care outlines nine National Standards of Practice for Interpreters in Health Care (2005) that work to ensure patient safety. These standards of practice have been compared against each modality to best evaluate the correlation between interpreting modalities and patient safety to assess which of the two modalities upholds the greatest number of standards of practice. By juxtaposing each interpreting modality against the industry standards and against evidence-based practices regarding patient safety, this project has deduced that certified in-person interpreting is the safest interpreting modality for the NES or LEP patient.

The Westfield Promise Program

Poster No.

Brielle Anderson, Westfield High School class of 2024	120
Faculty Sponsor: Kristen Biancuzzo, Westfield High School and Wyatt Hermansen, Westfield State University	
<i>The Westfield Promise Path to Healing</i>	
For thousands of years and across cultures, labyrinths were designed to symbolize a hard path toward God, when reaching the center they felt a spiritual connection to nature and the spirit world. Labyrinths continue to be used for spiritual purposes, providing a safe space for people to "find themselves" by following a path to the center and then finding their way back. Labyrinths are also used as walking meditations to help calm anxiety, promote self-reflection and reduce stress. The labyrinth is important to the greater Westfield community as a place for people to heal, meditate, and help their overall mental health. Our Westfield Promise class decided to build a labyrinth on the grounds of Westfield High School. We have been working to host major fundraising events, such as the Great Pumpkin Music Festival and a Raffle Basket Fundraiser at Take Charge Nutrition. We have completed research about labyrinths, generated design ideas for the project, and are working with our WHS community along with WSU. We spoke to the Westfield School Committee and are presenting at the WHS Health and Wellness Fair in order to educate our peers about the project. We have participated in workshops with certified labyrinth facilitators, created small scale labyrinths, and are currently working on designing and engineering our final project with groundbreaking in May/June. We want the labyrinth to speak to the hearts and minds of the community. The labyrinth and this project are a journey that requires patience. Our hope is that students of WHS and the general public will find it as a helpful tool to guide them through their healing.	
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