Saint Vincent College

21ST ANNUAL ACADEMIC CONFERENCE

April 24, 2024

2:30 – 7 P.M. | SIS AND HERMAN DUPRÉ SCIENCE PAVILION

A multidisciplinary exposition and presentation of student research and academic accomplishments in business, communication, computing, education, humanities, fine arts, mathematics, natural sciences, social sciences and other fields.

FREE ADMISSION

OPEN TO THE PUBLIC

112685-4/2024

Dear Saint Vincent College Community and Friends,

We welcome you to the 21st annual Saint Vincent College Academic Conference, during which we celebrate the interesting and often innovative work our students produce throughout the year. This conference is a testament to the dedication of Saint Vincent faculty and administrators who encourage and support students in conducting advanced scholarly inquiry and creative work in their disciplines. Saint Vincent faculty dedicate their time to mentoring students in critical scholarship, as well as in classroom projects in the Humanities, Natural Sciences, Computer Sciences, Social Sciences, Arts, and Business. The students who present at this conference have ambitiously seized these opportunities and brought their projects to completion. We are very proud of their work, and we invite you to take part in this event which recognizes their achievement. This conference is an opportunity for our students to enlighten our academic community by sharing new ideas and creative expression.

The Academic Conference is held in the Sis and Herman Dupré Science Pavilion. This venue facilitates engagement and interaction among Saint Vincent College students, faculty, administrators, staff, friends and family. The central atrium and surrounding hallways are the site of art demonstrations and poster presentations from students in diverse disciplines. The classrooms on the first floor of the atrium and the east wing of the complex hold panel sessions that include oral presentations of research and critical analysis papers, literary readings and musical performances. At the Verostko Center for the Arts Gallery (located on the 2nd floor of the Latimer Library), senior studio art and digital art & media students display their work. We encourage all attendees to explore the many high-quality intellectual pursuits our conference showcases!

This program contains the schedule of oral and poster sessions and abstracts for each presented project. Please peruse this booklet to find presentations that pique your interest and to learn more about the works our students have accomplished. An electronic version of this program is also available – look for signs around the pavilion with a QR code that will bring you directly to the program on the Saint Vincent website.

Many people have dedicated time and energy to bring this conference to fruition. The faculty, students, staff and administrators who were directly involved in planning the conference are listed in this program. This list, however, is far from comprehensive in recognizing the many individuals who extended themselves at this busy time of year to make this conference possible. This conference is truly a community-wide effort.

We hope that you emerge from your time at the conference with a fuller appreciation for the intellectual dynamic that lies at the center of our work at Saint Vincent College.

Sincerely,

Annie Laurie Nichols
Terrance Smith
2024 Academic Conference Co-Chairs

Saint Vincent College
Twenty-First Annual Academic Conference

2024 Academic Conference Committee

Dr. Annie-Laurie Nichols, Co-chair

Dr. Terrance Smith, Co-chair

Dr. Derek Breid

Dr. Sarah Dumnich

Dr. Devin Fava

Dr. Tim Kelly

Dr. Peter Smyntek

Dr. Mitch Taylor

Acknowledgements

The committee wishes to thank everyone who helped to prepare for this conference. We especially thank the following people and groups for their assistance:

Mr. George Fetkovich, for designing the cover and promotional materials

Saint Vincent College FMO staff, for their efforts in setting up for the event

Ms. Kaylee Goykovich, for assisting in the creation of the abstract submission form

The students and committee are also grateful to the faculty who assisted the students with the preparation of their work. Names of faculty sponsors appear in their students' entries in this program.

Grant Support for Student Research

The following grant programs support student-designed research and study at Saint Vincent College. Individual project entries indicate grant-supported projects, where applicable, throughout the program.

The A.J. Palumbo Student Research Endowment

Established in 1996, the Palumbo grant program supports student-initiated learning and discovery in the arts, sciences, humanities and professional programs. Grants are awarded on the basis of proposals submitted by the students and reviewed by a committee consisting of both faculty and students. The endowment memorializes the late Mr. A. J. Palumbo, a noted Pittsburgh industrialist.

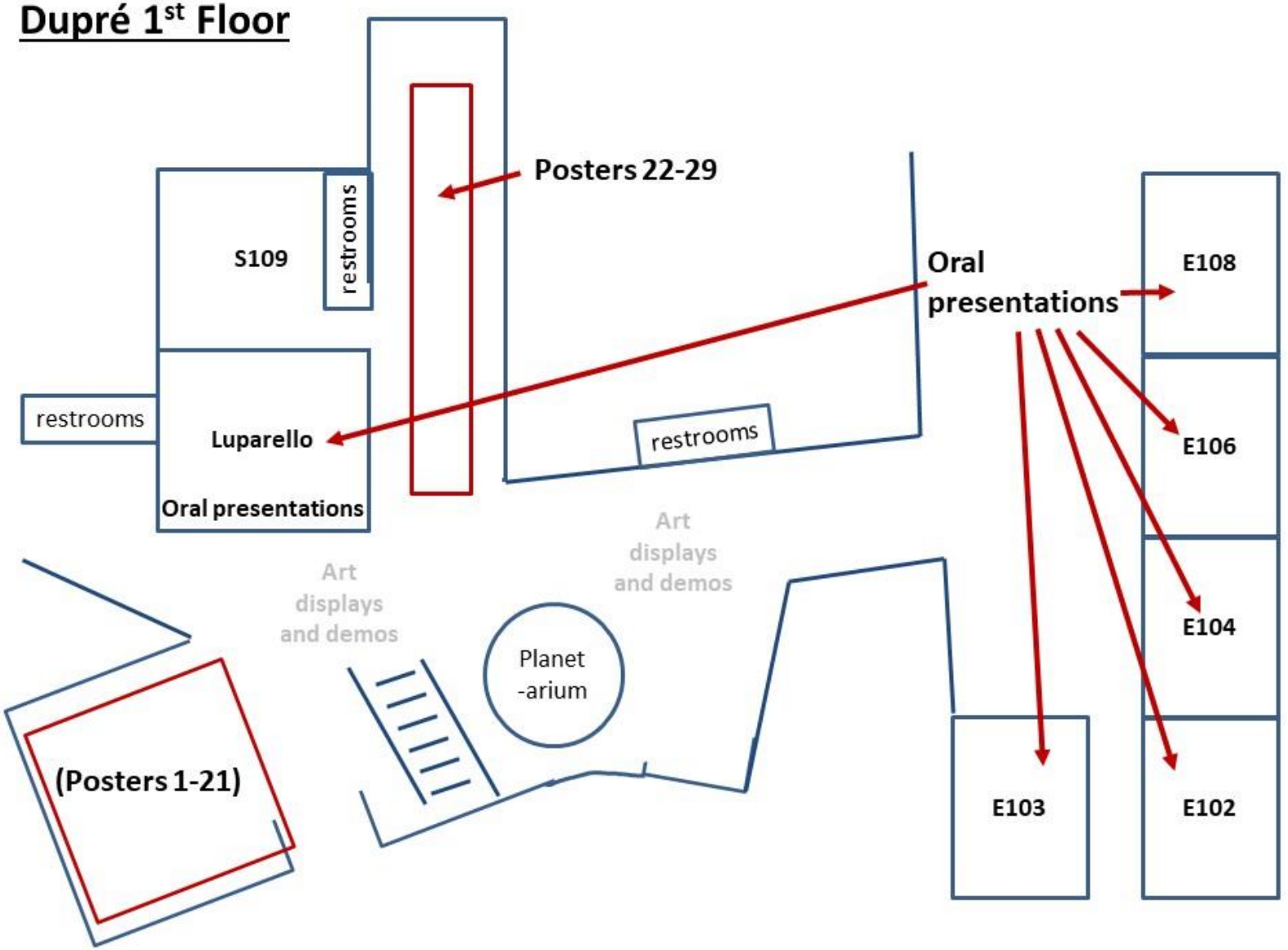
The Elizabeth and Tom Andreoli Traveling Scholar Endowment

Established in 1997, the Andreoli Traveling Scholar Endowment funds students who wish to enrich their education through special opportunities that require travel in the U.S. or abroad.

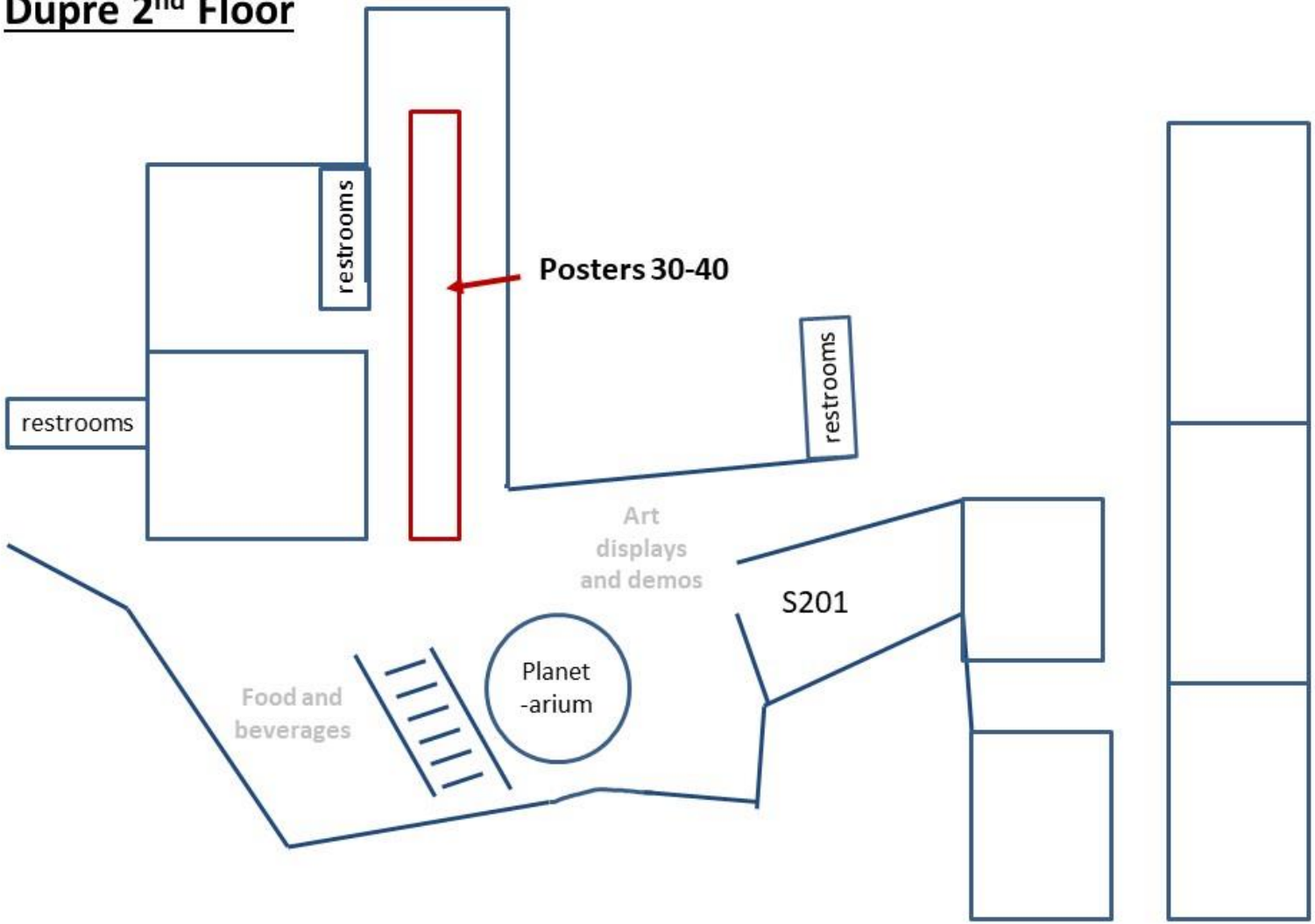
Donors

Support for the Academic Conference is given in memory of Dr. Greg Howard C'68, by Donna Howard.

Dupré 1st Floor



Dupré 2nd Floor



Oral Session 1: 2:45-4:00

E102
Chemistry & Physics
Fr. Michael Antonacci, O.S.B.

Synthesis of an adamantyl substituted N heterocyclic carbene precursor, Nicholos Benson

MIDSX: A Monte Carlo Interaction and Dosimetry Simulation of X-rays, John Meneghini

The Bose-Hubbard Model and Machine Learning, Will Mallah

E103
Criminology & Psychology
Dr. Kayla Jachimowski
Dr. Mark Rivardo

Supporting Adolescents with Substance Abuse: An Evaluation of the Criminal Justice System's Role, Allison Sopko

A Rehabilitative Approach to Reforming Youth Incarceration, Allyssa Black

Effects of Daily Marijuana Use in 16-25 Year Olds, Zachary Herbinko

Responses to Social Media Posts on Controversial Issues, Elizabeth Crockett

The Effects of Lineup Type on Eyewitness Accuracy: An Investigation into the Influence of Culprit Presence/Absence in Lineups, J'Shawn Taylor

E104
English
Dr. Dennis McDaniel

Literary Dublin: Personal Journeys, Kylie Brinza, Isabella Jolly, James Ivory, Nolan Casey, Roman Rhodes, Sullivan Kennedy, Madilyn Scola, Alexander Ryan, Julia Hogan

E106
Economics & Data Science
Dr. Mary Regina Boland
Dr. Andrew Herr

Framing Effects in Cournot and Common Pool Resource Games, Joseph Valenty, Matias Bugallo, Jeffrey Raynor

Developing Interactive Applications to Solve Real-World Financial Analytics Problems: A Data Science Capstone Project, Logan Goblesky, Olivia Persin

E108
Philosophy & Politics
Dr. Jerome Foss

The Virtue of Religion, Parker Bowser

Politics Internship, Zachary Barkman

The Detrimental Impact of Corporate Influence on the Commercial US Rail Industry: An Exploratory Study, Nicholas Walters

Political Polarization Now Seated on Americas Highest Court: How Legal Questions Have Become Political Questions, Brianna Saylor

American Exceptionalism in "Moby-Dick; or, The Whale": an American Leviathan, Delaney Fox

An Analysis of Abraham Lincoln through Thomistic Philiosphy, Joel Loomis

Luparello
Engineering
Dr. Derek Breid

Making the Saint Vincent Living Chapel More of a Cohesive and Defined Space., Brad Hallick, Alex Hess, Hunter Grimes, Michael Fekete

Oral Session 2: 4:15-5:30

E102
Anthropology & History
Dr. Tim Kelly

Building Skills in UX Design through an Anthropology Capstone, Bridget Doyle

The Boy From Milwaukee: How Liberace's Childhood Impacted His Life, Laura Wargo

FDR: Building Leadership Through Crisis, Brady Adamson

The Influence of Religion on African American Underground Railroad Conductors in Western Pennsylvania, William McClellan

The Benefits of 'Bridget': How Domestic Work Facilitated Economic and Social Opportunities for Irish Women in America, 1850-1920, Bridget Doyle

E103
Business & Management
Mr. Mark Kachmar

Supplier Evaluation Process Improvement for The Fulmer Company, Evan Rega, Taylor Wahl, Robert Harrington, Zachary Mumpower, Erwin Suarez

The Elliott Group Tool Crib Operations, Margaret Edwards, Gina Aiello, Jonathon Bouknight, Alexis Yanits, Dino Capozzoli

Pressure Vessel and Headplate Hydrotest Gaskets, James Sword, Madalyn Smith, Nicolena Yanosick, Caleb Hawkins

E104
Engineering
Dr. Adam Wood

Engineering Design: Building a Wind Tunnel, Tyler J. Dancu, Angelo A. Difilippo, Katlyn A. Dobransky, Brayden W. Gibson, Tyler D. Horn, Michael G. Iuzzolino, Joseph W. Jafarace, Jillian E. Mannarino, Joseph B. Nace, Bailey Nicely, Kristen B. Prince, Jordan M. Raynor, Eduardo M. Richa, Lily M. Rush, Matthew S. Sadusky, Antonio J. Scalamogna

E106
Biology
Dr. Jennifer Koehl

Mood Microbes: Antidepressants and Bacterial Growth, Anthony Campoli

The Effect of Probiotics on Blood Cholesterol, Giana Georgiana

Microorganisms Breaking Down Plastic, John Hurley

Prebiotics and Probiotics take on Gut Dysbiosis, Tanisha Grewal

Effects of Sucralose, Saccharin, and Aspartame on Wistar Rat Intestinal Growth (in vitro), Triston Odroneic

The Effects of Nicotine Addiction and Withdrawal on Anxiety and Stress Hormone Production in Swiss-Webster Female Mice, Sydney Campbell

The Effects of Pesticide Imidacloprid on Decomposition of Small Mammals, Anna Doelling

E108
Mathematics
Dr. Sarah Dumnich

The Evolution of Baseball Offense, Deven Haywood

Predicting Airline Ticket Prices in India, Kassidy Cambal

Movies and Gross Earning: What Factors Can Predict Success?, Kate Lipscomb

Analyzing Factors Associated with Life Expectancy, Nora Cabala

Predicting Sleep Duration, Alejandro Martinez

Budgeting Health Insurance in the United States Using Factors Responsible for Higher Expenses, Angelina Bucci

Predicting Salaries in the Data Science Field, Catherine Dzikowski

Predicting Reading Complexity Across Grades 3-12: A Linear Regression Approach Using Natural Language Processing Features, Nick Abegg

Understanding The Relationship Between Health Indicators and Covid Growth Rate, Victoria Barone

Looking at the factors that affect scoring in a NHL game, Noah Baker

Luparello
Engineering
Dr. Derek Breid

An Application of Engineering in Community Healthcare: Designing an Assistive Pill Counting Device for Retail Pharmacies, Arthur Bartlow, David Bujdos, Brayden Davis, Collin Frydrych, Noah Miller

The Engineering Design, Analysis, and Assembly of a Rodent Performance Test of a Rotating Rod Driven by a Motor (Rotarod), CJ Ciecierski, Mitchell Tryon, Andres Mateos, Brandyn Brock

Automated Precision: Design and Implementation of a Screwdriver Robot for Industrial Applications, Joseph Sarraino, Frank Startare, Anthony Vanderelli, Brevin Urso

Art Exhibitions: Both Sessions

Art Demonstrations and Exhibits

1st Floor Atrium; 2nd Floor outside room S201

Stained Glass Demonstration

Tanner Adomaitis, Azzia Berestecki, Giana Georgiana, Sarah Morgan Burger
Studio Art
Br. Mark Floreanini O.S.B.

We will demonstrate stained glass window design, glass cutting, soldering, and assembling of small stained glass panels.

Stained Glass Artwork and demonstration

Garrett Miller
Visual Arts and Media Design
Br. Mark Floreanini O.S.B.

At this table I will be showcasing stained glass items that I have created over the last two semesters while also demonstrating the technique of copper foiling stained glass for use jewelry making. The copper foil technique is an alternative to lead stained glass and is safe for jewelry making and many other applications.

Oil Painting Demonstration

Catherine Van Haute
Studio Art
Br. Mark Floreanini O.S.B.

Demonstrate oil painting using a still life.

Oil Painting

Charlotte Jordan
Art Administration in Performing Arts/Art Education/Art History
Br. Mark Floreanini O.S.B.

Art Education, Sophmore, from Germantown Maryland. I've been doing anything art-related since I can remember. Some of my favorite mediums are oil paint, graphite pencils, and crocheting.

Additional senior artwork is on display in the Verostko Center for the Arts located on the 2nd floor of the Latimer Library

Art Exhibits
2:45-5:30

Evolve: 2024 Senior Showcase

A collaboration between the College's Visual Arts and Media Design Department and the Verostko Center for the Arts, the 2024 Senior Showcase features the creative work of ten students majoring in Digital Art + Media, Communication and Media Studies, and Studio Art. Collectively taken, this cohort of seniors produced projects that encapsulate their transformation as emerging creatives. The videos, photographs, screenprints, stained-glass, and designed print collateral that comprise this year's exhibit are evidence of students' ability to use both digital and analog tools in the service of narrating ideas of deep personal significance. The artist statements listed below offer insight into this cohort of seniors' work.

As part of the 2024 Academic Conference, all are invited to view the 2024 Senior Showcase at the Verostko Center (Dale P. Latimer Library, 2nd floor) between 10:00 a.m. – 6:00 p.m. on Wednesday, April 24. For the Center's normal hours, visit verostkocenter.org. *Evolve* runs through May 8.

Donovan Baxter (Pitcairn, Pennsylvania)
Majors: Digital Art + Media, Studio Art

I feel that design is all around us, as everything we see is designed both with and without intention. We design our lives everyday with a series of choices. I feel we were all creators at some point until we decided to stop, to give up, and to silence that part of our drive.

In my process, I take on an artist's approach to design. In the early stages of my projects, I tend to focus less on the restrictions and regulations, and put my complete focus into creative output. I work primarily in digital as it allows for repeated and consistent change. To see thousands of versions of your work and to select the right one is a freeing and fulfilling experience. I cover my screen in loaded artboards in an attempt to uncover the answer. I feel the best logos, brands, and design elements are discovered and not created. The job of a designer is to unearth the solution that was present the entire time. Every failed iteration is simply a step toward revealing the final cut.

Lilly Chabala (Carnegie, Pennsylvania)
Major: Digital Art + Media

I see art everywhere.
I don't believe art requires words.
I believe art can have many and/or no emotions.
I think in pictures.
I make magic.
Some of my best artwork is created by mistake.
I make art.
Art is Me.

Art Exhibits
2:45-5:30

Caitlin Cole (Pittsburgh, Pennsylvania)
Major: Digital Art + Media
Minor: Sociology

I admire simplicity and find inspiration in small details. Whether it be a discarded painting lying within a stairwell, the way light shines through stained glass, or trampled cherry blossom petals beneath my feet, when amidst these moments I find beauty. My video incorporates a sequence of videos that examine these details. While filming, I focused on showing exactly why and how I find beauty within them.

Alex Colecchia (Greensburg, Pennsylvania)
Major: Digital Art + Media
Minor: Communication and Media Studies

Most people don't want to hear a sob story. I could talk all about how I was diagnosed with autism in the second grade and how difficult school and socialization were for me, or how I had to rely on what little help I was given just to get through.

Or I could twist it into an inspirational story about overcoming adversity, how I managed to graduate high school despite my condition and losing my educational support at the age of 15, or even how I got into Saint Vincent, and how I got onto the bowling team.

But I am not going to do that. Instead, I just want to show you all of the creative things that I do. From my digital art and graphic design work, the paintings and drawings I've made, to even my photography and video work, I hope that through these mediums I am able to share the thoughts and feelings that I have to you.

Even though you can't hear my voice, I'd love for you to be able to see it.

Cameron Dimeo (Ellwood City, Pennsylvania)
Major: Digital Art + Media

We are constantly adapting as human beings, much like the ever-evolving world around us. This concept has always intrigued me. As I journey through life making decisions, embracing risks, and delving deeper into the digital world we all live in, I am committed to proficiency in technology, media, design software, and crafting visually appealing content.

I have always had a passion for technology and media with a keen eye for visuals and intricate details which often go unnoticed. This passion has always challenged me to ask myself, "How can I do that?" With professorial guidance during my collegiate journey and self-learning, I've come to appreciate the allure of the digital realm. This appreciation fuels my ambition to translate the diverse skills I have learned into a fulfilling lifelong career.

While I maintain a daily connection to technology and media, I also strive to maintain balance between the digital world and the real world. We are all increasingly dominated by screens and virtual interactions, where it becomes easy to be engulfed in the digital world. I understand that one must have parity with the value of both digital connectivity and real-world experiences. While staying informed and adept in the digital landscape is crucial for personal and professional growth, it's equally essential to routinely disconnect and allow ourselves to appreciate the tangible beauty of our world. We must pledge to engage in meaningful face-to-face interactions to nurture our connection with one another. This balance not only promotes mental well-being, but also enriches our understanding of the world, fostering a deeper sense of connection with ourselves and others.

Art Exhibits
2:45-5:30

Jakob Gmuer (Latrobe, Pennsylvania)
Major: Digital Art + Media

I am a photographer. Taking pictures is something I have found very exciting, because cameras capture beautiful moments, with the best clarity and make them last forever. I document special moments in life that bring a lot of joy to me so that one day I can go back and relive a memory. When it comes to digital art and media, I like to think of words like creative or imaginative.

When taking photos I become a more creative person. From the moment I am holding the camera to the second I press the button, I have a rush of energy flying though me. Once I find the perfect shot the relief in my body then follows. For me, photography is a lot like playing hockey. Sometimes trying to take the perfect picture or video is like measuring up your shot on the ice, both can be competitive. I always want to try and be the best.

Jacklyn Koehler (Rockledge, Florida)
Major: Communication and Media Studies

Since I was born my family always had at least one animal in the house. My mom would call the house a zoo but to me it felt more like a jungle. From the first dog I was with as a baby to the most recent bulldog my family acquired. Our animals have always been trained to be well behaved and learn some special tricks. We trained our pets so as to not jump on people, to sit, give paw, turn around, and behave on a leash. Growing up with animals that I knew wouldn't harm me helped for me to see how bonds are formed.

After careful consideration, I plan to become a K-9 trainer. The dogs will sense harm and allow other to know certain codes to tell them, if threatened. With the training of these K-9 dogs many homes and children will feel protected as I did. This project explores how the bonds my family has created with animals to help me decide this is what I want to do and who I am as a person.

Monique Koehler (Rockledge, Florida)
Major: Communication and Media Studies

Walk into a bowling alley, you will see people from as young as three and as old as 90. Families are reunited all the time for birthday parties, accomplishments, and even just to get together. People come for the excitement and challenge of the game.

This project explores the bond that was created through bowling with family and friends. I have bowled since I was 8 years old and always has been a big part of my family's busy life. Bowling reminds me of the art of having a special bond with family and friends. Much like the ten bowling pins that are set up at the end of the lane we stand united. The ball is like life events interfering those gatherings, yet those ten pins always come back to stand together.

Art Exhibits
2:45-5:30

Kieran Rapp (Pittsburgh, Pennsylvania)
Major: Digital Art + Media

Your hand trembles to pick up the piece and move it. But what chess teaches you is that you must sit there calmly and think about whether it's a really good idea and whether there are other, better ideas. - Stanley Kubrick

My work is not bound by a specific style. I adapt to different genres, styles, and emotions into my work. How does my work differentiate from my peers, and how will it be mine? I ensure each shot is intentional, I make sure that each shot varies from one another.

My goal is to create captivating narratives. As part of my creation process, I often talk to myself. I walk through everything I need to capture stories that enable audiences see what I see through my lens. I often argue with myself to make my final work as fascinating as possible.

Lauren Turkovich (Jeannette, Pennsylvania)
Majors: Studio Art, Digital Art + Media, Business Administration
Minors: Economics, Communication, and Media Studies

We often spend time focusing on what we see around us or what others think when they look at us. My work seeks to represent the invisible or the untouchable parts of our lives. Using digital tools to represent emotion, human biology, and personal experiences I solidify these unseen parts of us.

It is human nature to seek out patterns in all forms whether in the natural world or created by people. I am drawn to the mesmerizing allure of geometric shapes and designs to represent the nonphysical. Their symmetrical arrangements have a natural harmony and precision that appeal to me. The pieces that I create are a reflection of my fascination with geometry's innate beauty. My artistic intention is to provoke viewers' curiosity and contemplation, inviting them to delve into the complex world of geometric abstraction to reveal the nuanced details hidden in plain sight.

E102: Chemistry and Physics

Synthesis of an adamantyl substituted N heterocyclic carbene precursor

Nicholos Benson
Chemistry
Faculty Advisor(s): Dr. Jason Vohs

N heterocyclic carbenes are catalysts, stabilizers, and designer ligands. This research attempts to expand the library of carbenes by building a known variety of precursor.

MIDSX: A Monte Carlo Interaction and Dosimetry Simulation of X-rays

John Meneghini
Physics
Faculty Advisor(s): Fr. Michael Antonacci, O.S.B.

Computed Tomography (CT) imaging, while essential for diagnostics, exposes patients to ionizing radiation. To accurately quantify radiation dosage, this study introduces MIDSX, a specialized open-source Monte Carlo (MC) photon transport code system for medical imaging. Unlike general purpose particle transport MC systems, MIDSX is tailored for x-ray transport, offering more streamlined implementation. Results from validation simulations show MIDSX's results for specific cases agree to within 0.39% of the mean of established reference data. However, discrepancies in body energy deposition measurements, reaching up to a 6.3% mean percent error, indicate areas for further refinement in the system.

The Bose-Hubbard Model and Machine Learning

Will Mallah
Physics
Faculty Advisor(s): Fr. Michael Antonacci, O.S.B.
NSF Grant

Entanglement entropy is a useful quantity for implementation of quantum computers and for characterizing phase transitions in quantum matter. However, in larger systems, exact computation becomes difficult as the Hilbert space, describing identical particles on a lattice, grows exponentially with the system size. Therefore, stochastic methods such as the Path Integral Ground State quantum Monte Carlo for Lattice Implementations (PIGSFLI) algorithm are needed. By comparing results between exact diagonalization calculations and that of the PIGSFLI algorithm, we show that quantum Monte Carlo is capable of accurately predicting several properties for small-scale, ground state Bose-Hubbard systems. We calculate entanglement entropy via exact diagonalization for both spatial and particle bipartitions of two particles on two sites described by the Bose-Hubbard model and compare the spatial results to those obtained from the PIGSFLI algorithm. Benchmarking how this algorithm operates for small-scale systems, which can be determined by exact diagonalization, provides a route to the accurate simulation of larger systems with a significant reduction in computational cost. Additionally, information on machine learning and its future applications to this project will be discussed.

E103: Criminology and Psychology

Supporting Adolescents with Substance Abuse: An Evaluation of the Criminal Justice System's Role

Allison Sopko
Criminology, Law and Society
Faculty Advisor(s): Dr. Kayla Jachimowski

Adolescent substance abuse is a complex challenge within the criminal justice system, it shows a need for a better understanding of policies and programs to help with prevention (Funk et al., 2020). This capstone demonstrates how the brain can be affected by addiction and the different ways that substances can affect the development of young individuals. Theoretical perspectives help explain different aspects that influence substance abuse within these individuals. Judging the existing interventions shows a problem in substance use prevention services and the importance of implementing evidence-based programs. This Capstone explores the benefits of reforming the justice system by focusing on rehabilitation through a case study that emphasizes the need for compassion. By using evidence-based practices, rehabilitation over disciplinary action, and early intervention, policymakers can increase the system's response.

A Rehabilitative Approach to Reforming Youth Incarceration

Allyssa Black
Criminology, Law and Society
Faculty Advisor(s): Dr. Kayla Jachimowski

Although there are many factors that play a role in a juvenile committing delinquent acts, incarcerating juveniles will not reduce recidivism rates. Data on recidivism consistently shows that youth who are released from correctional confinement experience high rates of rearrest, new adjudications (in juvenile court) or convictions (in adult court), and reincarceration (Mendel, 2023, para. 5). This capstone analyzes whether incarcerating youth is determined to be an effective or ineffective strategy. For example, through the approach of Differential Opportunity Theory, young individuals will resort to deviant activity due to the inability to reach success. The juvenile justice system was formed for the purpose of providing youth with options for rehabilitation while attempting to keep these individuals at home and active in the community; however, thousands of juveniles are sent to detention centers and prisons.

Effects of Daily Marijuana Use in 16-25 Year Olds

Zachary Herbinko
Criminology, Law and Society
Faculty Advisor(s): Dr. Kayla Jachimowski

There are roughly 11.8 million young adults who have reported using marijuana from the ages 16-25. This capstone investigated the effects of daily marijuana use for ages 16 through 25 years old, including both long term and short-term consequences. These include respiratory problems, mental illness problems, and having delinquency problems in school (Lutman, 2015). Rational Choice Theory best explains why these users are abusing marijuana daily even though there are several harmful side effects. The goal of this capstone is to inform people about the effects of marijuana in daily use, and how it can negatively alter that user permanently. The results of daily marijuana use and how simple it is for younger adults to find marijuana has lowered scores on preservative responding and flexible thinking. Marijuana is one of the easiest drugs for people to find around their area and the ability to use it in multiple ways makes it a popular drug for younger people to use.

Session 1: Oral Presentations
2:45-4:00

Responses to Social Media Posts on Controversial Issues

Elizabeth Crockett
Psychological Science
Faculty Advisor(s): Dr. Mark Rivardo
A.J. Palumbo Student Research Endowment

Cognitive dissonance and its effects have been examined over the past 70 years. In light of political tensions and increased polarization in recent years, it is important to look at how it is dealt with on social media platforms. According to the principle of homophily, individuals want to interact with others like themselves. False consensus effect states individuals assume similarities to others in beliefs. However, after finding out about differences in belief, reactions can differ. Cognitive dissonance, or the inconsistency between two elements can result. On social media, people may take different approaches, and may choose to handle their dissonance differently. This can be done through blocking, unfriending, or muting a persons profile. Differences in reactions and approaches for dealing with cognitive dissonance may be explained by a variety of different theories and models. The goal of this study is to see whether type-of relationship (friend, close friend, family member, acquaintance), position of poster towards the statement shown (agree, disagree) and position of the participant relative to the statement shown (agree, disagree) affect the likelihood of avoidance behaviors on social networking sites (blocking, unfollowing, muting). Findings demonstrated that consistency between poster and the participant affects the likelihood of engaging in avoidance behaviors.

The Effects of Lineup Type on Eyewitness Accuracy: An Investigation into the Influence of Culprit Presence/Absence in Lineups

J'Shawn Taylor
Psychological Science
Faculty Advisor(s): Dr. Mark Rivardo

The effects of lineup type on eyewitness accuracy were evaluated in a sample of N = 173. Participants viewed a mock-crime video. After the video, participants were randomly assigned one of the four conditions (simultaneous, culprit present; simultaneous, culprit absent; sequential, culprit present; or, sequential, culprit absent) and given instructions on the type of lineup (simultaneous or sequential) they were going to view. Based on probative value, simultaneous lineups, 85.07%, were a better overall lineup than sequential lineups, 82.05%. Results were theory consistent, as identification accuracy was significantly higher when the culprit was present than when absent, $X2(2, 173) = 46.909$, $p < .001$. A 5x3 ANOVA with confidence (none at all, a little, a moderate amount, a lot, a great deal) and identification accuracy (hit-rate, false alarm, false alarm but not innocent other) found that participants who identified the culprit were more confident at time of identification as between-subjects factors revealed a main effect of confidence, $F(2, 173) = 6.989$, $p = .001$. The results of the present study support the hypothesis that participants who are more confident in their decisions will be more accurate (Quigley-McBride and Wells, 2023).

Session 1: Oral Presentations
2:45-4:00

E104: English

Literary Dublin: Personal Journeys

Kylie Brinza, Isabella Jolly, James Ivory, Nolan Casey, Roman Rhodes, Sullivan Kennedy, Madilyn Scola, Alexander Ryan, Julia Hogan

English

Faculty Advisor(s): Dr. Dennis McDaniel

Small groups of students from the Literary Dublin class report their experience with a chosen topic while in Dublin. For example, one group of students will report their personal experience with the Abbey Theater through reading plays first staged at the theater and then through attending a play at the theater over spring break, 2024.

E106: Economics and Data Science

Framing Effects in Cournot and Common Pool Resource Games

Joseph Valenty, Matias Bugallo, Jeffrey Raynor
Economics
Faculty Advisor(s): Dr. Andrew Herr

This paper focuses on framing effects in the context of Cournot and Common Pool Resource (CPR) games. Specifically, we frame the game using competitive terminology in the Cournot treatment and cooperative terminology in the CPR treatment. We hypothesize that these framing effects will impact participants behavior, with CPR players behaving more cooperatively, leading to higher earnings.

Developing Interactive Applications to Solve Real-World Financial Analytics Problems: A Data Science Capstone Project

Logan Goblesky, Olivia Persin
Data Science
Faculty Advisor(s): Dr. Mary Regina Boland

Interactive applications are developed in collaboration with Federated Hermes to provide financial analysts with a convenient method to interact with data provided through Morningstar Direct. A suite of ipython notebooks were constructed within the Morningstar Analytics Lab, as well as an interactive web-hosted Dash app in python. The Dash app uses data downloaded from Morningstar Direct, providing filters to sort through the data based upon specific user-selected Morningstar Categories to output a visualization of market share statistics.

E108: Philosophy and Political Science

The Virtue of Religion

Parker Bowser
Philosophy
Faculty Advisor(s): Dr. Carl Vater, Dr. Lucas Briola

What is religion and what is its place in the public sphere? In the modern day, there are a multitude of definitions for the term religion, ranging from a simple collection of emotional feelings, to a set of spiritual rules that one is compelled to follow. Furthermore, how does religion relate to others? Some may argue that religion has a negative effect on society, dividing rather than unifying. Others may even argue that religion is harmful to one's relationship with God, complicating it with unnecessary rules and dogma that create interference between humanity and the divine. On the contrary, this paper will argue that it is proper to the human person for the act of religion to be a public act. This paper will pull from the writings of Saint Thomas Aquinas, one of the most profound voices of both the Middle Ages, and the Church. This paper will begin by arguing for the existence of human virtue and the Natural Law. Further, this paper will explore the virtue of justice, and its potential part, the virtue of religion, which is defined as the ones rendering to God what is owed to Him, insofar as He is goodness itself and insofar as He is creator. Finally, this paper will explore the social nature of the human person, and the natural inclination of goodness to communicate itself to others, and from this, argue that the human person's act of religion is a public act.

Politics Internship

Zachary Barkman
Politics and Political Science
Faculty Advisor(s): Dr. Jason Jividen

My name is Zachary, and I am graduating with a Bachelor's Degree in Political Science. While I attended Saint Vincent for four full years, my time in the Politics department has been rather short. My first two years I was studying Biochemistry, and I switched in the fall of my junior year.

Because of my brief time in the department, I was rather surprised when I was approached by a professor about taking an internship in the Congressional District Office in Latrobe, belonging to Guy Reschenthaler. Though I was unsure at first, I am very glad I took this opportunity. I did not do the interesting work as an unpaid intern, but I did learn.

I want to present, not necessarily to glorify my own achievements, but to share with an insider prospective how Congressional District Office's operate. If you had told me that I would work in a Congressional District Office and never once ask callers how they vote, I would think you were lying. If you had told me that to individual citizens, a call to a Congressional District Office could prevent them from losing everything they own, I would not believe it. I did not know how important these services are, and how you really can go to your own government for help in different situations.

I would like to shed the light on how these offices are benefitting the citizens of our country every day, with specifics coming from right here in SW PA.

Session 1: Oral Presentations
2:45-4:00

The Detrimental Impact of Corporate Influence on the Commercial US Rail Industry: An Exploratory Study

Nicholas Walters
Politics and Political Science
Faculty Advisor(s): Dr. Jason Jividen, Dr. Jerome Foss

The purpose of this study is to investigate if the rail industry's resistance to government regulations jeopardizes workers, communities, and the environment by delaying the use of technologies and methods that minimize or prevent rail accidents, particularly rail accidents involving hazardous materials.

My study looks at the historical development of rail regulation in the United States. Additionally, I have looked into corporate influence's effect on government regulatory policy. Lastly, I have looked at specific examples of rail catastrophes and provided an analysis of how these incidents could have been minimized or avoided.

Political Polarization Now Seated on Americas Highest Court: How Legal Questions Have Become Political Questions

Brianna Saylor
Politics and Political Science
Faculty Advisor(s): Dr. Jerome Foss

RESEARCH QUESTION: How has increased polarization in Americas political institutions, especially the Supreme Court, impacted landmark decisions that have changed the landscape of American life, especially in the last two decades?

The Supreme Court was established nearly two hundred thirty-five years ago. It has since served as the final arbitrator of law, ensuring the American people are provided equal protection and due justice. However, while the highest court in the land may have once been a body of constitutionally recognized legitimacy fashioned by the American people themselves, this is no longer the case. Today, the United States Supreme Court faces a challenge that is the first of its kind—the wrath of an able-bodied and powerful nation, the American people. The American people are growing tired of the court's hard pivots, which seem to reopen and undermine long-standing precedents that are out of step with their values. As the Supreme Court grapples to find footing on an unsteady foundation, its institutional legitimacy is weakening amid growing questions of increased political polarization on the court and the court itself being a player in politics in the contemporary world.

American Exceptionalism in "Moby-Dick; or, The Whale": an American Leviathan

Delaney Fox
Politics and Political Science
Faculty Advisor(s): Dr. Jerome Foss

Political theory can appear in many forms, from philosophy to treatises and even literature. Literature from the American Renaissance, in particular, often analyzes the way that issues like property, rights, and power help to define the America of that era. This paper explores the political thought of American Renaissance author Herman Melville, specifically focusing on "Moby-Dick; or, The Whale," and will argue that Melville uses "Moby-Dick" to warn Americans against futile attempts to escape or overthrow the Hobbesian Leviathan of American exceptionalism, instead suggesting that they ought to temper the ambition prompted by the regime in an Aristotelian manner. American exceptionalism, by claiming the peoples rights as suggested in the chapter Fast-Fish and Loose-Fish" and instituting social mores through pillars of capitalism, colonialism, and Christianity, becomes a Leviathan, a sovereign with absolute authority in Thomas Hobbes' famous theory. Melville sends the narrator from the regime to the sea to

demonstrate the lasting effects of exceptionalism on those under it. Ahab, like Aristotle's magnanimous man, transcends his humanity due to Leviathan's goal of domination and leads the crew to their doom. For Americans to avoid the tragic fate of the Pequod, they must learn to temper their desire to dominate by retaining their connection to humanity as a whole.

An Analysis of Abraham Lincoln through Thomistic Philosophy.

Joel Loomis
Politics and Political Science
Faculty Advisor(s): Dr. Jerome Foss, Dr. Jason Jividen

Abraham Lincoln is one of the most loved and hated presidents in American history. The love comes from his philosophy of the governmental system which involves the Constitution acting as means that reach the ends of the Declaration. This system ultimately argues for the preservation of natural rights and leads to the freeing of slaves. The hatred, however, comes from how this process was done. Many writers, including members of the supreme court have discussed how his suspension of habeas corpus was Lincoln breaking the law and going against such a fundamental right. I try to answer the question on if Lincoln's actions during the civil war were entirely just?

This question can be answered through an analysis of Lincolns philosophy through the lens of Thomistic Philosophy. First Saint Thomas Aquinas's philosophy shows in Q.57 that rights can be subject looked at through two scales. Natural rights (actions which are made naturally just), and positive rights (actions which are made just through public agreement). Then we will look towards Lincoln's obedience towards the law. Saint Thomas Aquinas believes that if one is not obedient towards the law then they are entirely unjust. Lastly to see if Lincoln is Just we will look towards Saint Thomas Aquinas's Philosophy on sedition and how it is a moral sin. Through this analysis we will conclude that Lincoln is naturally Just.

Session 1: Oral Presentations
2:45-4:00

Luparello: Engineering

Making the Saint Vincent Living Chapel More of a Cohesive and Defined Space.

Brad Hallick, Alex Hess, Hunter Grimes, Michael Fekete
Engineering
Faculty Advisor(s): Dr. Derek Breid
Private donation

The Living Chapel in Rome is a self-sustainable promotion of unity with all of Gods creation where one can pray, meditate, or reflect. The previous engineering capstone team sought to emulate this experience with Saint Vincents own Living Chapel. Team Improve the Rain Curtain wanted to make the current prototype of the Saint Vincent Living Chapel a more cohesive and defined space that encourages self-reflection, with flowing water and surrounding plant-life providing a comfortable and natural environment for visitors. The layout was completely reorganized to give the chapel an intuitive sense of orientation and purpose for anyone visiting, as well as give them an impression of being within a space while not feeling trapped by it. Large fabric-pocket living walls guide visitors into the area where they are directed towards a concrete keystone piece fountain that is meant to provide visual guidance into a mental state of self-awareness and thought. Accenting the keystone piece on either side are the previous teams rain curtains, providing not only a visual and audible aesthetic, but also a means of irrigating the chapels many plants. This irrigation system, along with being solar powered, make this chapel an environmentally friendly and self-sustainable method of experiencing and appreciating your place amongst all of Gods creation.

Session 2: Oral Presentations
4:15-5:30

E102: Anthropology and History

Building Skills in UX Design through an Anthropology Capstone

Bridget Doyle
Anthropology
Faculty Advisor(s): Dr. Elaine Bennett
A.J. Palumbo Student Research Endowment

Considering the importance of career readiness for undergraduate students, the senior anthropology capstone was used as a platform for students to build on their anthropological skill set to develop and apply skills in UX Design. The completion of this project demonstrated an understanding of and skills in anthropological inquiry, as well as the ability to delineate and reflect on the skills and perspectives they have developed through the study of anthropology. This presentation will utilize skills gained through anthropology coursework and Google's Professional UX Design Certification to outline and analyze the efficacy of embedded career-oriented skill development and application in both assessing student learning outcomes and in promoting career readiness.

The Boy From Milwaukee: How Liberace's Childhood Impacted His Life

Laura Wargo
Public History
Faculty Advisor(s): Dr. Karen Kehoe
The Elizabeth and Tom Andreoli Traveling Scholar Endowment

The topic of my senior thesis is Liberace, more specifically how his childhood impacted his behavior as an adult. His childhood was spent in Milwaukee, Wisconsin during the 1920s and 30s, so he would have grown up during the Great Depression as well. During his childhood, he was poor and had to come to the realization that he was born homosexual, which was not acceptable during his lifetime. Liberace's childhood is an important topic to study because it is important to understand the complexities of popular and influential historical figures like Liberace. Liberace is an important topic himself because he had a major impact on our modern popular culture.

The sources I will be using for my study are a wide range of biographies, autobiographies, local Milwaukee history, and journal articles on social history. The biographies on Liberace will go into details that were excluded from Liberace's autobiographies, since the performer did not want to include specific details that would have been catastrophic to his career. The autobiographies by Liberace will provide a first-hand account into his behavior as an adult and the childhood he had. Journal articles on social history, such as LGBT history, will help give insight into the environment that Liberace would have been living in, especially regarding his homosexuality. The articles on Milwaukee history, focusing on the 1920s and 30s.

Session 2: Oral Presentations
4:15-5:30

FDR: Building Leadership Through Crisis

Brady Adamson
History
Faculty Advisor(s): Dr. Tim Kelly
The Elizabeth and Tom Andreoli Traveling Scholar Endowment

This particular thesis dives into the life of the 32nd United States President, Franklin Delano Roosevelt and how he navigated the many issues that he faced in his life personally and politically. Also, this specific thesis analyzes how Franklin Delano Roosevelt navigated these personal and political issues as well as how these crises developed his overall leadership style. Another angle of the project analyzes the perception of Franklin Delano Roosevelt as the opinion regarding his leadership style has varied over the course of time.

The Influence of Religion on African American Underground Railroad Conductors in Western Pennsylvania

William McClellan
History
Faculty Advisor(s): Dr. Tim Kelly

The Underground Railroad was a loose network of safe houses and trails that Freedom Seekers used to escape from slavery in the Southern United States. Most of the Underground Railroad research in Western Pennsylvania focuses on the European-American conductors who participated in the movement, rather than the African Americans who participated in the movement and the African American institutions that made the Underground Railroad possible. By highlighting the influence of African Americans and their churches' participation in the Underground Railroad, we can see how, despite making up less than 2% of Western Pennsylvania's population, were critical to the functioning of the Underground Railroad and would go onto be leaders in their local African American communities.

The Benefits of 'Bridget': How Domestic Work Facilitated Economic and Social Opportunities for Irish Women in America, 1850-1920

Bridget Doyle
History
Faculty Advisor(s): Dr. Tim Kelly
The Elizabeth and Tom Andreoli Traveling Scholar Endowment

Domestic work in the United States during the 19th-20th centuries granted Irish women numerous economic and social opportunities that they could not have achieved in Ireland due to the lasting effects of the Potato Famine and the strict societal control of the Catholic Church. Irish women were successful in their efforts to create new lives for themselves in the United States. Their immigration to America allowed them to discover a society where they could work, control their own finances, and make decisions for themselves. The constant stream of Irish women that immigrated during the twentieth century and letters they exchanged with family members in Ireland reinforces Irish women’s desire for greater opportunity and the availability of such in the United States. Despite difficulties that came with being in a new country, Irish women were generally satisfied with their decision to immigrate. Domestic service granted them the greatest opportunities in their new country, and Irish women came to dominate the industry between 1850-1920. Utilizing modern research and historical data, I argue that Irish women in the United States during the 19th-20th centuries were successful in their search for greater economic and social opportunities abroad.

E103: Business Administration and Management

Supplier Evaluation Process Improvement for The Fulmer Company

Evan Rega, Taylor Wahl, Robert Harrington, Zachary Mumpower, Erwin Suarez
Business Administration
Faculty Advisor(s): Mr. Mark Kachmar

The current Supplier Evaluation Process for The Fulmer Company lacks consistency and fails to deliver efficient, robust data for informed decision-making or to pinpoint opportunities for continuous improvement.

The business case: the development of an efficient, accurate scorecard that provides meaningful insights into supplier impact.

The Elliott Group Tool Crib Operations

Margaret Edwards, Gina Aiello, Jonathon Bouknight, Alexis Yanits, Dino Capozzoli
Business Administration
Faculty Advisor(s): Mr. Mark Kachmar

Throughout our Green Belt Preparation class, our group has worked hand in hand with the Elliott Group in Jeannette, PA to combine our knowledge of Lean and Six Sigma tools and the Elliott Group's need for a more efficient Tool Crib to help better the processes used internally within their business. Therefore, we look present on this project recommending potential solutions to the Elliot Group and their Tool Crib staff, while also showcasing our knowledge and skills we have learned over the past semester through lectures and hands-on experience.

Pressure Vessel and Headplate Hydrotest Gaskets

James Sword, Madalyn Smith, Nicolena Yanosick, Caleb Hawkins
Management
Faculty Advisor(s): Mr. Mark Kachmar

The tool crib at Elliot Group is the storage location for many tooling and MRO (maintenance, repair, and operations) items, which, over the years has lost track of its inventory and has become somewhat unorganized. Because of this, items are not available when needed, and they are purchasing the wrong and/or too many products unnecessarily. This also impacts production times and the overall efficiency of the resources.

Elliot Group is looking to solve the efficiency problems of their new cryogenic pump testing area. The issue with flange ordering is that usage is inconsistent and unorganized. They are looking for a lean process for not only their shop floor but also the management aspect of it as well.

We have worked closely with Elliot and used a DMAIC (define, measure, analyze, improve, control) approach to put a plan in place to improve efficiency. For better access to gaskets, the team has put a storage closet in a more visible area to ensure less movement and inventory waste. With that, we have also implemented other solutions to provide better inventory management.

Session 2: Oral Presentations
4:15-5:30

E104: Engineering

Engineering Design: Building a Wind Tunnel

Tyler J. Dancu, Angelo A. Difilippo, Katlyn A. Dobransky, Brayden W. Gibson, Tyler D. Horn, Michael G. Iuzzolino, Joseph W. Jafarace, Jillian E. Mannarino, Joseph B. Nace, Bailey Nicely, Kristen B. Prince, Jordan M. Raynor, Eduardo M. Richa, Lily M. Rush, Matthew S. Sadusky, Antonio J. Scalamogna

Engineering

Faculty Advisor(s): Dr. Adam Wood

Students in Engineering Design and Lab (ENGR 240) have worked over the semester to design and build a wind tunnel. In this session, they will present their design process, final products, and talk about challenges they encountered.

Session 2: Oral Presentations
4:15-5:30

E106: Biology

Mood Microbes: Antidepressants and Bacterial Growth

Anthony Campoli
Biology
Faculty Advisor(s): Dr. Jennifer Koehl
A.J. Palumbo Student Research Endowment

Depression affects more than 322 million people or 4.4% of the world's population (Flux & Lowery, 2021). Antidepressants are known for their harsh side effects; probiotics are microorganisms that produce beneficial effects once ingested. This research will test the effectiveness of probiotics to alter the effects of an antidepressant (IH) on the growth of two gut microbiome bacteria, *Escherichia coli* and *Staphylococcus epidermidis*. It was hypothesized that the antidepressant will affect the growth of the Gram-negative bacterium (*E. coli*) more than the Gram-positive bacterium (*S. epidermidis*), and the probiotics will reverse the antidepressant effect on growth. The concentration of IH that stops growth was determined using Kirby Bauer and minimal inhibition concentrations (MIC) assays and growth curves were conducted. Antidepressant data showed the *S. epidermidis* had a significantly ($p<0.05$) higher MIC value than *E. coli* meaning less IH was needed to alter *S. epidermidis* growth. Results also showed that growth and MIC did not change when the probiotic was added. Overall, this research showed antidepressants influence bacterial growth, more so with the Gram-positive bacterium than the Gram-negative bacterium. Finally, probiotics did not alter the antidepressant impact of *E. coli* and *S. epidermidis* growth.

The Effect of Probiotics on Blood Cholesterol

Giana Georgiana
Biology
Faculty Advisor(s): Dr. Jennifer Koehl
A.J. Palumbo Student Research Endowment

High blood cholesterol is a contributor to cardiovascular disease, a leading cause of death in the U.S., as well as many other life-threatening diseases. Probiotics are living microbes that are found in fermented foods. Growing scientific evidence has indicated that supplementation with probiotics can reduce total blood cholesterol levels. This project's aim was to investigate the effects of probiotics on blood cholesterol levels. Two groups of mice were fed a high-cholesterol diet (HCD) consisting of rat chow and palm oil; one group also had the probiotic *Lactobacillus rhamnosus* added to their water. Mouse weights, food intake, and blood samples were then taken, and blood cholesterol concentrations were determined. It was hypothesized that mice given an HCD and probiotics would have increased food consumption and a decrease in total blood cholesterol levels compared to mice given an HCD without probiotic supplementation. Results show that mice supplemented with *L. rhamnosus* probiotics consumed significantly ($p<0.05$) less food than mice without supplementation. The cholesterol detection assay revealed that mice supplemented with *L. rhamnosus* had a decrease in total blood cholesterol while mice without supplementation had an increase in total blood cholesterol, however these results did not reach a statistical significance level ($p>0.05$).

Microorganisms Breaking Down Plastic

John Hurley
Biology
Faculty Advisor(s): Dr. Jennifer Koehl
A.J. Palumbo Student Research Endowment

Plastic waste in the ocean and soil is a growing problem. Several microbes have shown promise in degrading a common plastic polyethylene. This experiment attempts to contribute to the knowledge of microbial polyethylene degradation. Fourier Transform Infrared Spectroscopy (FTIR) and optical density readings (O.D.) were used to measure polyethylene degradation with the fungus *Aureobasidium pollulans* 9348 and the bacterium *Bacillus subtillus* 6341. After eight days incubating with polyethylene, *B. subtillus* 6341 had a final optical density reading of 0.47 +/- 0.09 and *A. pollulans* 9348 had 0.44 +/-0 .05. There was no significant ($p<0.05$) difference between the bacteria regarding growth but both grew utilizing the polyethylene based on cloudiness. Post experiment FTIR scans showed changes to the plastic indicating the organisms broke some of it down. These findings confirm that *B. subtillus* 6341 and *A. pollulans* 9348 can breakdown polyethylene and grow on it, allowing both to be good candidates for future experiments to break down plastic waste.

Prebiotics and Probiotics take on Gut Dysbiosis

Tanisha Grewal
Biology
Faculty Advisor(s): Dr. Jennifer Koehl
A.J. Palumbo Student Research Endowment

The bacteria in an individual's gut is known as the gut microbiome. Gut bacteria are important in human health, as they supply essential nutrients, aid in digestion, outcompete disease causing microbes, and promote angiogenesis, as well as enteric nerve function. Probiotics are live microorganisms that result in health benefits to the host while prebiotics, non-digestible dietary ingredients, selectively stimulate the activity of the gut microbiome. The purpose of this study is to investigate how prebiotics and probiotics impact gut dysbiosis.

Groups of mice will be fed varying diets with either probiotics, prebiotics, both, or neither. Half of the mice will ingest ampicillin to induce dysbiosis within the gut to determine how the diet impacts this. Mice will be weighed, and their fecal matter will be plated on varying types of media.

The data concludes that dysbiosis was successfully induced as the bacteria quantified was significantly less once ampicillin was introduced. Fecal matter from the groups of mice were diluted and the colony forming units per mL, plated on different media. Results from this were compared.

Effects of Sucralose, Saccharin, and Aspartame on Wistar Rat Intestinal Growth (in vitro)

Triston Odroneic
Biology
Faculty Advisor(s): Dr. Jennifer Koehl
A.J. Palumbo Student Research Endowment

The human gut microbiome has a complex composition of trillions of organisms, including bacteria, viruses, archaea, and fungi that regulate digestion, neurological development, and immune function, which can all be impacted by diet. Low-calorie sweeteners (LCS) are growing in popularity due to the rise in diabetes and obesity, but their effects on the gut microbiome are still unclear. For this experiment, common LCS were introduced to an in vitro culture of rat intestinal bacteria and growth was measured over a period of 30 days in oxygen concentrations (aerobic and anaerobic) typical of the human intestine across three types of media, replicated three times. Colony counting was used to quantify growth. No growth was observed on EMB media, which only allows Gram-negative bacteria like *Escherichia coli* to grow. BAP media grows all types of bacteria, while MRS only grows the probiotic Lactobacillus bacteria. MRS and BAP both showed growth across the LCS and oxygen conditions, showing that the in vitro system

was viable. No significant difference ($p > 0.05$) was observed across the different LCS and oxygen conditions. This indicates that there are no gut microbiome growth differences based on LCS.

The Effects of Nicotine Addiction and Withdrawal on Anxiety and Stress Hormone Production in Swiss-Webster Female Mice

Sydney Campbell
Biology
Faculty Advisor(s): Dr. Michael Rhodes
A.J. Palumbo Student Research Endowment

Long-term nicotine consumption is known to decrease activity of the hypothalamic-pituitary-adrenocorticotropic (HPA) axis, leading to a decrease in stress hormone production and a decrease in anxiety-like symptoms. Withdrawal increases the HPA axis activity, producing the opposite effects. My study used mice to examine the effects of nicotine addiction and withdrawal on stress and anxiety. Nicotine was administered to two experimental groups within a bottle of drinking water, allowing the mice to self-administer the nicotine. After 12 days, nicotine was removed from the bottle of the withdrawal group. The successive alleys test was used to examine anxiety in the mice, corticosterone analysis was completed, and the adrenal glands were weighed to measure stress hormone production and secretion. It was expected that the nicotine addiction group would show the lowest number of anxiety-like symptoms, and the withdrawal group would show the highest number of anxiety-like symptoms, with highest levels during early withdrawal. The study showed trends of increasing stress in the withdrawal group by an increased adrenal gland size and an increased amount of time spent in the black alley during the successive alleys test. This study focused on anxiety-like symptoms found in mice, which could be applied as a model to understanding human nicotine addiction and withdrawal.

The Effects of Pesticide Imidacloprid on Decomposition of Small Mammals

Anna Doelling
Biology
Faculty Advisor(s): Dr. Michelle Duennes
A.J. Palumbo Student Research Endowment

Pesticides are crucial to the preservation of global agricultural systems and food security. Despite the importance of pesticides to all plant agriculture, the past few decades of toxicological research have demonstrated that many pesticides have negative impacts on the environment. One understudied area is the effect of pesticide use on decomposition. Decomposition is important for the recycling of nutrients in the environment; crucial to that cycle is the many insect species that feed on decaying plant and animal tissue. This experiment examined the effects of a specific pesticide called imidacloprid on the decomposition of small mammals. After treating Swiss Webster mice with this pesticide orally and/or topically, they were euthanized and introduced to controlled colonies of dermestid beetles to facilitate decomposition. This research serves to understand the unknown effects of pesticides on biological processes such as decomposition.

E108: Mathematics

The Evolution of Baseball Offense

Deven Haywood
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

The development of offence in Major League Baseball between 1876 and 2020 is the subject of this study. It examines shifts in important offensive metrics like home runs per game, slugging percentage, on-base percentage, and batting average. The study looks into how this evolution has been impacted by changes in player mentality, equipment advancements, and rule changes. It highlights how tactics like the "dead ball era," "live ball era," and "steroid era" have changed the game's offences by comparing offensive techniques from various eras. The goal of the study is to present a thorough knowledge of how baseball offence has changed over the past 100 years.

Predicting Airline Ticket Prices in India

Kassidy Cambal
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

This project aims to predict the price of a ticket for a flight in India. I have converted the currency to US dollars to increase the interpretability. The constructed model will help determine if the price varies based on airlines, how the price is affected depending on when the ticket is purchased, if the price changes based on arrival and departure time, if the price changes based on the departure city or destination city, and how price varies based on the class (business or economy). The model created in this project will be helpful for buyers of airline tickets including individuals traveling, groups traveling, or businesses who need to send employees to other locations. It will inform them on when to buy an airline ticket and which factors, they should consider.

Movies and Gross Earning: What Factors Can Predict Success?

Kate Lipscomb
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

The aim of this report is to predict the gross earnings for any movie. The movie business has undergone many changes recently so predicting success ahead of time makes a large difference. Key features like runtime, genre, or featured actors can be used to determine more effective advertising plans. Being able to predict the gross earning of a movie before it reaches theaters can provide executives more time to plan their actions following the box office release.

Analyzing Factors Associated with Life Expectancy

Nora Cabala
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

This project seeks to make inferences about variables associated with life expectancy throughout the world. Some of these variables include adult mortality, BMI, Hepatitis B immunization, population, schooling, income composition of resources, and development status. The data for this project was collected from the Global Health Observatory data repository under the World Health Organization. This

data was collected for 183 countries in 2015. This project will utilize multiple methods of statistical modeling including multiple linear regression and polynomial linear regression to make inferences about the association between life expectancy and other variables. These models will shed light on which factors are correlated to a higher life expectancy of countries around the globe.

Predicting Sleep Duration

Alejandro Martinez
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

I am building a model that predicts sleep duration by analyzing various different factors. Understanding the impact of these variables on sleep duration is important for identifying both positive and negative influences on individuals' sleep patterns. Using linear regression and statistical techniques, this model aims to provide insights into the relationship between factors such as lifestyle choices and physiological factors, and their effects on sleep duration. The findings from this model can help understand how different factors can affect the duration of sleep of an individual.

Budgeting Health Insurance in the United States Using Factors Responsible for Higher Expenses

Angelina Bucci
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

The purpose of my project is to aid those looking to invest in health insurance. A regression model will be able to predict the cost of health insurance using numerical and categorical predictors. Some of these predictors include age, BMI, and if they smoke. This information is useful as the United States has high out-of-pocket expenses for those without health insurance. The hope is that the relationship between these predictors and health insurance costs will guide people to judge if they have enough funds, need to make lifestyle changes, or do not want to proceed with getting health insurance at all.

Predicting Salaries in the Data Science Field

Catherine Dzikowski
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

The aim of this project is to construct a model capable of predicting salaries within the data science field. This model integrates various parameters including geographic location, level of experience, remote work opportunities, company size, and more. Its primary utility lies in providing accurate projections of prevailing salary trends, which is particularly beneficial for Saint Vincent College students poised to enter the data science workforce post-graduation.

Predicting Reading Complexity Across Grades 3-12: A Linear Regression Approach Using Natural Language Processing Features

Nick Abegg
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

The objective of this statistical analysis was to create a linear regression model to predict the reading complexity of a piece of text that is leveled for 3rd-12th grade. The model utilized features from the text

including word count, sentence count, and word complexity. An initial basic linear regression model was created, and its performance was assessed. Subsequent iterations of the model aimed to improve on areas of poor performance and increase the model's accuracy while still ensuring the model was not overfitted. The aim was to create a model that accurately predicts the reading complexity of a piece of text utilizing only natural language processing features extracted from the text.

Understanding The Relationship Between Health Indicators and Covid Growth Rate

Victoria Barone
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

This report aimed to build a linear model that helps understand relationships between different health factors and the Covid-19 growth rate. The "Country Health Indicators" dataset is a collection of 11 smaller subsets: kaggle1 (Covid-19 cases and deaths), ourworldindata1, ourworldindata2, ourworldindata3 (death causes), FAO1 (food sources), WHO1, WHO2, WHO3 (health care system information), BCG1 (TB vaccine status), UNESCO1 (school closures), and CIA1 (people/society facts). The response variable for this research project will be the Growth Rate in covid cases. Potential predictor variables which will be evaluated are death rates of Cardiovascular disease, cancer, diabetes, respiratory diseases, liver diseases, nutritional deficiencies, obesity, HIV/AIDS, tuberculosis, and smoking as well as different types of food consumed in the countries diets, number of doctors, number of anesthesiologists, hospital beds per 10,000 people, amounts of school shutdowns, and the population, though some of these were trimmed out of the final model due to a lack of reporting for the variable or a lack of significance.

Looking at the factors that affect scoring in a NHL game.

Noah Baker
Mathematics
Faculty Advisor(s): Dr. Sarah Dumnich

For this project, I built a model that looks at which variables are related to the amount of goals scored in a hockey game. Some of variables are: shots, powerplays, whether the team was at their home arena, etc. The target variable here is goals, which is a numeric variable. This model can then be used by anyone interested in whether goals are affected by different variables. This can be helpful when figuring out which areas to focus on the most when trying to score more goals. This can help a team win more games.

Session 2: Oral Presentations
4:15-5:30

Luparello: Engineering

An Application of Engineering in Community Healthcare: Designing an Assistive Pill Counting Device for Retail Pharmacies

Arthur Bartlow, David Bujdos, Brayden Davis, Collin Frydrych, Noah Miller
Engineering
Faculty Advisor(s): Dr. Derek Breid

Have you ever spent time waiting in line for a prescription? Since the COVID-19 pandemic, around 75% of pharmacists report that they are running out of time to fill prescriptions while simultaneously performing their clinical duties as healthcare professionals. This time-consuming process of filling prescriptions is sometimes referred to as counting and can have serious legal implications if a prescription is dispensed incorrectly. With the guidance from an experienced Rite Aid pharmacist, our team has been developing a new tool aimed at helping pharmacists count pills quickly and correctly so that they can get back to serving their communities with medical advice, consultations, vaccinations, and other responsibilities. Our new tool leverages the use of interchangeable grid-like trays to accommodate the wide range of shapes, sizes, and dosage forms of common medications and features an electronic scale to verify that the number of pills has been correctly counted. Initial trials reveal that our new pill counting tool can complete prescriptions in nearly half the time required by standard counting methods, potentially improving the outlook of working conditions for pharmacists and quick access to healthcare in communities around the world.

The Engineering Design, Analysis, and Assembly of a Rodent Performance Test of a Rotating Rod Driven by a Motor (Rotarod)

CJ Ciecierski, Mitchell Tryon, Andres Mateos, Brandyn Brock
Engineering
Faculty Advisor(s): Dr. Derek Breid

Understanding the effects of various conditions or developing new treatments is integral to our society. One way in which researchers achieve this is through animal testing. A test used to evaluate an animals balance, coordination, and motor function is the Rotarod. The Rotarod test is a common laboratory test used and the SVC Biology Department would like to have access to it. This design team has been tasked with developing a Rotarod for the Biology Department. Dr Bethke & Dr Breid are the teams main client and supervisor to direct the goals and engineering of the project. Research and discussion with stakeholders helped determine the Rotarod must be animal resistant, easy to use, humane, and portable. The team then broke the Rotarod into 4 main sections; Rotating rod, Drop detector, lane divider, and Interface display. Designs for each section were developed, presented, refined, and evaluated. Testing was then used to select a final design and begin prototyping. The prototype was presented to stakeholders and used as the basis for the final design. Our final Rotarod consists of 3 lanes, openings at the top and bottom of each lane for easy placement and retrieval, a belt driven motor & encoder for speed control, 6 distance detectors for drop detection, and 4 digital displays for data retrieval. This design achieves our goal of developing a Rotarod for the Biology Department

Session 2: Oral Presentations
4:15-5:30

Automated Precision: Design and Implementation of a Screwdriver Robot for Industrial Applications

Joseph Sarraino, Frank Startare, Anthony Vanderelli, Brevin Urso
Engineering
Faculty Advisor(s): Dr. Derek Breid

Powerex is a local electronics company that specializes in the manufacturing of semiconductors. At Powerex, the semiconductors assembly line bottleneck necessitated the alteration of a screwdriver robot to expedite processes and free up employee time. This project focused on designing fixtures to accommodate semiconductors and programming the robot to outperform human counterparts in speed and accuracy. Our team designed an intermediate fixture to interface with the deck of the robot, and two part-specific fixtures to hold the parts. The robot was tailored to Powerex's needs, resulting in significant improvements in production throughput and resource allocation. By automating repetitive tasks, the robot reduced errors and optimized efficiency, allowing employees to focus on more strategic projects. This initiative highlights the transformative potential of robotics technology in streamlining manufacturing processes and boosting productivity.

Posters: Session 1

1. The Assessment of the Effects of Nicotine and Cinnamaldehyde on Conditioned Place Preference (CPP) and Anxiety-like Behavior in Zebrafish

Kathleen Keating
Biology
Faculty Advisor(s): Fr. Shawn Anderson O.S.B.
A.J. Palumbo Student Research Endowment

Vaping is becoming more common in the US and is causing E-cigarette, or Vaping, Product use Associated Lung Injury (EVALI). Vapes contain nicotine, which is the primary ingredient in tobacco. Tobacco is the leading cause of preventable death in the United States. Understanding the effect nicotine has on zebrafish can provide insight into how nicotine affects behavior. Experiment 1 evaluated the reinforcing properties and anxiety-inducing effects of nicotine. It was predicted that during CPP, zebrafish exposed to nicotine would prefer the nicotine paired side of a tank. It was also predicted that zebrafish would show a higher amount of anxiety-like behavior in a Novel Tank after exposure to nicotine. Experiment 2 tested whether a flavoring would affect these effects of nicotine. Cinnamaldehyde was used to flavor the nicotine and test whether the effects on behavior would be more prevalent. Experiment 1 indicated a dose-dependent changes in preference and in anxiety-like behavior. Results from Experiment 2 CPP were inconclusive. The results from the Novel Tank test indicate a dose-dependent effect of cinnamaldehyde, as zebrafish exposed to 2.5 mg/L cinnamaldehyde, and 30 mg/L nicotine showed an anxiolytic-like phenotype. These data suggest that using zebrafish to evaluate effects of vaping solutions will be beneficial.

2. Effects of Sleep Deprivation on Fatigue and Cognition in Adolescent Swiss Webster Mice

Steven Manon
Biology
Faculty Advisor(s): Fr. Shawn Anderson O.S.B.
A.J. Palumbo Student Research Endowment

For many individuals, sleep becomes less important as life goes on. However, sleep deprivation has been shown to have negative effects on both physical endurance and performance, along with learning and memory. This experiment tested three hypotheses. First, it was hypothesized that partial sleep deprivation would decrease cognitive function in mice, resulting in limited learning and memory compared to controls. Second, mice who had been sleep deprived would have lower physical endurance than mice who were not sleep deprived. Third, an additional group of mice received injections of Omeprazole, which is a medication used to treat acid reflux. Studies have indicated cognitive and physical effects from long term or excessive usage of Omeprazole. As a result, it was hypothesized that mice who were partially sleep deprived and received Omeprazole injections would have impaired learning and cognition, lower swim times compared to mice from the other groups. To test these hypotheses, a novel object recognition test which involves a learning phase and testing phase for location of objects. Further, a weighted forced swim test was performed to investigate how long the mice could swim, determining their physical endurance. Ultimately, although the behavior of mice exposed to sleep deprivation was negatively affected, results of the behavioral tests were inconclusive.

3. Effects of Whey Protein, Soy Protein, and Beta Alanine on Muscle Strength in Adolescent Male Swiss Webster Mice

Sean Pavlic, Andrew Bottino
Biology
Faculty Advisor(s): Fr. Shawn Anderson O.S.B.
A.J. Palumbo Student Research Endowment

The use of supplements is a common practice among athletes. Soy protein is similar to whey protein, but is a vegan alternative.-alanine is known to reduce production of lactic acid during exercise. This study used four groups; mice receiving whey protein (whey), whey+-alanine (w+), soy protein (soy), and soy+-alanine (s+). This experiment tested the hypothesis that (w+) mice and (s+) mice would have increased muscle endurance than other groups (whey and soy). It was also hypothesized that soy mice would show similar grip strengths as whey mice. Grip strength was defined as the force required to loosen the grip of the mouse from an apparatus. The second test was a weighted swim test. Mice with a sinker that was 5% of their body weight tied to their tails swam until fully submerged under water for 3 seconds. Data revealed that only soy mice did not lose weight during the experiment. All other groups initially lost weight, but as the experiment continued, they gained back that weight. (w+) and (s+) mice, though weighing less than whey and soy mice, had heavier soleus and EDL muscles than groups without-alanine. Another observed trend was that (w+) and (s+) mice showed higher increases in grip strength compared to the whey and soy mice. The experiment supports the use of soy as a whey substitute and the use of-alanine as a practical supplement to increase strength.

4. Panax ginseng and Gingko biloba Extracts Promote Cell Viability in SH-SY5Y Neuroblastoma Cells but Not Brain Derived Neurotrophic Factor Expression

Abbey Krug
Biology
Faculty Advisor(s): Dr. Bruce Bethke
A.J. Palumbo Student Research Endowment

Huntington's disease, an inherited disorder that causes brain degeneration, is caused by mutant huntingtin protein. Studies have shown that neuronal cells expressing mutant huntington protein (htt), exhibit reduced levels of Brain Derived Neurotrophic Factor (BDNF), a protein necessary for neural survival. Which has been linked to an upregulation of Repressor Element 1-Silencing Transcription Factor (REST). This study investigated the ability of extracts of Panax ginseng leaf and stem, and Gingko biloba leaf, to suppress REST expression, and thereby increase the expression BDNF in SH-SY5Y human neuroblastoma cells. In a background of wild-type Htt expression, exposure to a combination of the two extracts led to increases in cell viability, however gene expression studies failed to demonstrate consistent alterations of either REST or BDNF expression following exposure to either, or both, of the extracts. Planned studies on the influence of the extracts in cells expressing mutant htt gene were hindered due to an inability to introduce the genetic construct to enough cells to yield measurable effects. Consequently, the hypothesis that exposure to extracts of P. Ginseng and G. biloba would repress REST expression, enhancing BDNF expression and promoting neuronal cell survival was not validly tested.

5. The Aquatic Pollutants Microplastics and Copper Act Synergistically as Circadian Rhythm Disruptors in Danio rerio

Katarina McCaffrey
Biology
Faculty Advisor(s): Dr. Bruce Bethke

Living systems have repeating internal oscillations, which occur every 24 hours, in rhythm with the environment light/dark cycles. These oscillations, known as circadian rhythms, coordinate biological activities with external cues. Circadian rhythm disrupters, which can include environmental chemicals, desynchronize internal biological clocks. This study examined the ability of the common aquatic contaminants, microplastics and heavy metals, alone or in combination, to disrupt behavioral and genetically-based rhythms in zebrafish. Specifically, groups of zebrafish were exposed to either 10 g/L polyethylene microspheres, 40 g/L copper sulfate, a combination of the polyethylene and copper, or left untreated, for a period of six weeks. shoaling and light/dark preference tests, as well as genetic tests through expression of cry1a and per2 clock genes. Collectively the data indicates that the combination of the two pollutants leads to greater disruption of circadian rhythms than independently. This suggest that as microplastic pollution continues to increase, its capacity to bind other significant contaminants will result in even stronger effect on the physiology and behavior of aquatic organisms.

6. Exposure to a Combination of Microplastic and Copper Pollutants Leads to Dysregulation of the Genes Controlling Sex Hormone Synthesis in Danio rerio

Jonah Vaglia
Biology
Faculty Advisor(s): Dr. Bruce Bethke
A.J. Palumbo Student Research Endowment

Microplastics and heavy metals contaminants are common in aquatic ecosystems, and their combination suggests a potential for enhanced synergistic toxicity. A demonstrated biological effect of microplastics and heavy metals is an alteration of sex hormone synthesis. In this study, zebrafish were exposed to 10 g/L of polyethylene microspheres, 40 g/L copper sulfate, or a combination of the two for a period of six weeks. Fish tissues were then recovered and transcriptional profiling of critical androgen pathway genes, namely Cyp11a1, Cyp17a2, and Cyp19a, was performed. Additionally, profiles of the MT2 metallothionine gene, which is induced by heavy metal toxicity, were performed. Dysregulation of the Cyp11a2, Cyp17a1, and Cyp19a genes was observed in the tissues of fish exposed to polyethylene microplastics and copper sulfate, alone or in combination, compared to control. Further, as expected, enhanced MT2 expression was observed in all fish tissues from the copper only, and combined polyethylene and copper treatment groups relative to those in the polyethylene-only and untreated control group. Enhanced MT2 expression was observed across nervous tissues in fish exposed to polyethylene microplastics and copper sulfate in combination when compared to all other groups. Finally, a surprising level of MT2 downregulation was observed in all treatment groups compared to control.

7. Attempted Characterization of the Combinatorial Effects of Microplastic and Copper Pollution on Aqueous Ecosystems Using a Zebrafish Model

Isabella Ladisic
Environmental Science
Faculty Advisor(s): Dr. Bruce Bethke
A.J. Palumbo Student Research Endowment

Microplastics, defined as plastic particles less than 5 mm in size, are widespread pollutants that have effects on aquatic life. These effects may be enhanced in the presence of other contaminants that microplastics bind, and potentially concentrate. Copper is a metal contaminant of aqueous systems, due to the extensive use of copper piping. This study attempted to test the effect of polyethylene microplastic spheres (10 g/L), and copper sulfate (40 g/L), individually, and in combination, on anxiety, learning, and memory in adult zebrafish. The animals were continuously exposed to the test agents for six weeks, during which they were subjected to weekly behavioral assays. Variability of performance was observed in the assays that could not be attributed to the treatments. Consequently, it was determined that the hypothesis was not properly tested. Further research is required to ascertain the combinatorial impact of microplastics and copper on neurological function and behavior in zebrafish.

8. Finding My Niche: Gaining Experience in a Wide Variety of Settings to find my Career Interests & Preferences

Jared Brown
Bearcat BEST
Faculty Advisor(s): Mr. Philip Pisone

Throughout my three years of Bearcat BEST, I gained valuable experience and a variety of skills. I have worked on-campus at Latimer Family Library, SVC Bookstore, Public Relations. I have worked off-campus at ShopnSave and Latrobe Area Hospital for my off-campus externships. I gained experience and learned skills in cleaning, food prep, office work, retail, and computer work. These experiences have set me up to gain competitive employment upon graduation.

9. Vocational Skills to Life Skills Gaining Independence at Work and Home

Kenneth Callaway
Bearcat BEST
Faculty Advisor(s): Mr. Philip Pisone

Bearcat BEST has given me the opportunity to learn many vocational skills through my internships on campus and my externships at Giant Eagle and Hampton Inn. I have learned many cleaning and food prep skills that will help me to be successful in my job after graduation as well as my everyday life.

10. Following the Recipe to Success: Learning the Skills Needed to Work Successfully in the Food Industry

Landon Carlson
Bearcat BEST
Faculty Advisor(s): Mr. Philip Pisone

During my time at Bearcat BEST, I learned many important skills. I completed my on-campus internships at the SVC Fitness Center, the Shack, and Parkhurst Cafeteria. Additionally, I worked off-campus at Giant Eagle and Eat'n'Park. While working these jobs, I learned important cleaning skills, food skills like food prep and packaging, and dishwashing. These skills have helped me gain the skills needed to obtain competitive employment.

11. Bowling Lanes to Excel Rows: Learning Skills for Future Employment

Ryan Shaffer
Bearcat BEST
Faculty Advisor(s): Mr. Philip Pisone

During my time at Bearcat BEST, I gained useful experience to help me improve as a job-seeker. I have worked at 3 on-campus internships, such as FMO in the Carey Center, the Shack, and the Saint Vincent College Bookstore. I have also worked at 2 off-campus externships, such as Main Bowling Center and West Media Group. The skills that I have learned are cleaning, counting money, inputting data and preparing food. These skills will help me gain competitive employment after graduation.

12. Helping Seniors to Helping the Community: Gaining Important Experience to Improve my Work Skills

Anthony Brown
Bearcat BEST
Faculty Advisor(s): Mr. Philip Pisone

During my time at Bearcat B.E.S.T I had a plethora of vocational opportunities. I worked 3 placements on-campus at the SVC Bookstore, SVC Archabbey Public Relations and SVC Admissions. Additionally, I worked 3 off-campus externships at Brookdale Nursing Home, Greater Latrobe Laurel Valley Chamber of Commerce and the Latrobe Historical Society. I have developed important skills including retail & customer service skills, computer skills, communication skills, senior care, media and design, and record keeping skills. These skills and experiences have helped me gain insight into what my future work after graduation may look like.

13. The Effects of Amoxicillin, Capsaicin, Sweet Orange, and Vanilla Oleoresin Essential Oils on the Growth of Staphylococcus epidermidis

Sophia Livelsberger
Biochemistry
Faculty Advisor(s): Dr. Matthew Fisher

Helicobacter pylori is the bacteria responsible for causing peptic ulcers through urease activity. Recently, H. pylori is becoming antibiotic resistant. In this study, different agents were used to try to inhibit the growth and the urease activity of the bacteria. *H. pylori* was unable to be grown, so *Staphylococcus epidermidis* was used since both bacteria rely on urease activity to survive. The essential oils chosen are from categories of food that someone may consume that could influence the gut microbiome. In this experiment, amoxicillin and three essential oils, capsaicin, sweet orange, and vanilla oleoresin, were used to test if they can inhibit the growth of *S. epidermidis*. Each essential oil was assessed by itself, as well as each was combined with amoxicillin. The essential oils were confirmed to be pure through the GC-MS. The effect these chemical agents had on *S. epidermidis* were tested using a Kirby-Bauer disk diffusion test to measure the zone of inhibition, and a minimum inhibitory concentration (MIC) assay that finds the lowest concentration needed to inhibit the growth of the bacteria. Urease activity was also evaluated through a urease test. Contrary to previous studies, it was found that capsaicin essential oil had minimal effect on *S. epidermidis* growth, while sweet orange essential oil had a synergistic effect with amoxicillin that was the most effective.

14. Fluorescence Qualitative Study of the Binding of Magnesium, Manganese, and Zinc to Troponin C and Possible Effects on its Conformational Change

Diego Martinez Ortiz
Biochemistry
Faculty Advisor(s): Dr. Matthew Fisher

Troponin C (TnC) is a subunit of the protein complex troponin located in the thin filaments of striated and cardiac muscle. Its main function is to trigger muscle contraction by binding calcium ions present in the sarcoplasm of muscle. However calcium availability in the body for this process to take place might have been affected due to the decrease in consumption of dairy products in current society, changing cow milk to vegetal kinds of milk as an example. Even though this should not be a problem as bones secrete calcium to the bloodstream whenever its concentration drops, the skeleton might weaken leading to bone diseases. Consequently, in this experiment, ions like magnesium, manganese, and zinc which can be easily obtained in any diet, are tested to see if they could potentially bind to the calcium-binding protein troponin. Finally, the binding of these alternative ions to troponin C could ultimately trigger the conformational change in troponin that allows muscle cells components to interact and induce muscle contraction. To achieve this goal, a series of titrations and measurements using fluorescence spectroscopy were performed to answer the proposed questions. The data recorded provided a qualitative analysis of the ions that bind and that are most likely to induce the conformational change in TnC, as no conclusion could be reached with this technique by itself.

15.THE EFFECTS OF PARAQUAT INDUCED REACTIVE OXYGEN SPECIES ON MITOCHONDRIAL PROTEIN EXPRESSION

Kristin Neeley
Biochemistry
Faculty Advisor(s): Dr. Matthew Fisher

Mitochondrial dysfunction, driven by reactive oxygen species (ROS), is implicated in various neurodegenerative disorders, including Alzheimer's disease and Parkinson's disease. This study investigates the impact of paraquat-induced ROS on the expression of key mitochondrial proteins, specifically superoxide dismutase and glutathione peroxidase, in yeast mitochondria. Initial experiments demonstrate the efficacy of a lysis buffer for isolating yeast mitochondria and the sensitivity of silver staining for protein detection. Furthermore, yeast mitochondria were incubated with varying concentrations of paraquat to induce ROS formation, followed by isolation and gel electrophoresis to analyze protein expression. Understanding these mechanisms could provide insights into the pathogenesis of neurodegenerative diseases and identify potential therapeutic targets.

16. Effect of pinoresinol on the aggregation of-synuclein

Brennen Novotney
Biochemistry
Faculty Advisor(s): Dr. Matthew Fisher

Parkinsons Disease (PD) is a progressive neurological disease that is associated with the degeneration of the dopamine producing region of the brain. This leads to reduced dopamine levels which result in classic motor symptoms such as resting tremor and difficulty in ambulating, but also in non-motor symptoms such as REM sleep behavior disorder and gastrointestinal issues. In most cases, PD develops from unknown origin. Since no cure exists for the condition, preventative measures are of great importance. Aggregation of the protein-synuclein into Lewy Bodies is generally linked to the development of PD. Inhibitory effects on this process were investigated with the organic compound pinoresinol, a lignan

commonly found in sesame seeds and olive oil. This was done by introducing pinoresinol into solutions of synuclein. The aggregation markerthioflavin-t (Th-T), which fluoresces when bound to aggregate proteinwas then used to track aggregation over time. In addition, size exclusion chromatography was used in conjunction with the Th-T assay. Fluorescence experiments showed that pinoresinol concentrations above a certain threshold (200 M) may act to increase aggregation.

17. The Effects of Artificial Sweeteners on Body Weight, Volume Consumption, Stress Hormones, and Anxiety Behaviors in Mice

Devin Barrett, Nicholas Helsel
Biology
Faculty Advisor(s): Dr. Michael Rhodes
A.J. Palumbo Student Research Endowment

Artificial sweeteners are marketed as a healthy alternative to sucrose. This study used mice as a model to better understand the effects of artificial sweeteners on levels of consumption, body weight, stress hormones, and anxiety behaviors. Four experimental groups, each with a sweetener of interest (sucralose, aspartame, acesulfame potassium, and sucrose, respectively) were studied, as well as one control group which was only presented with water. Sweeteners were administered as solutions alongside regular water bottles in the experimental cages. Marble burying tests assessed anxiety in the mice, which demonstrated differences in behavior based on the administered sweeteners. Consumption levels for all of the groups increased, except for the group which was treated with acesulfame potassium. Weight gain for each of the groups increased throughout the experiment, with the sucrose group demonstrating the greatest increase in weight. The sucralose and aspartame groups showed the greatest difference in weights between the left and right adrenal glands, indicating decreased levels of stress in comparison to the other groups and a sense of being rewarded by the sweeteners. Corticosterone levels recorded from fecal sample collections revealed elevated corticosterone present in the acesulfame potassium group, and diminished corticosterone values for sucralose compared to the control

18. Presentation and Loss of Environmental Enrichment Toys: Effects on Stress and Affective Behaviors in Male and Female Mice

Mei Jenkins-Andrews
Biology
Faculty Advisor(s): Dr. Michael Rhodes

The housing conditions of laboratory animals can affect both their behavior and physiology. The goal of this study was to investigate the effects of EE (environmental enrichment) and EE removal on the stress response, through the HPA axis, as well as anxiety and depressive behaviors on both male and female mice. We hypothesized that the removal of EE would increase the stress response, anxiety, and depression and that the female mice would have increased responses. The EE consisted of toys that elicited natural mouse behaviors and there were three experimental groups: EE (environmental enrichment), ER (EE removed), and C (control). At the start of the study, the EE and ER groups were given EE. The EE group kept the EE for the remainder of the study while the ER had their enrichment removed after 2 weeks and the C group was housed in standard housing conditions. We found that the removal of EE had sexually diergic effects: anxiety and depression behaviors decreased in female mice post-EE removal but increased in male mice. Also, the presentation of EE had the opposite effects where anxiety and depression increased in female mice but decreased in male mice. Therefore, the physiology and behavior of laboratory mice can be affected by changes in their housing environment in sexually diergic ways.

19. Using Geneious to Build Bumble Bee Genomes

Lucia Johnson
Biology
Faculty Advisor(s): Dr. Michelle Duennes
A.J. Palumbo Student Research Endowment

A genome is all the genetic information in an organismis mainly, although not limited to, deoxyribonucleic acid (DNA). The general process of acquiring genomic data includes extraction of the DNA from the organism of study, cleaning of the DNA to eliminate contamination from other biomolecules such as ribonucleic acid (RNA) or proteins and sequencing the DNA using high-throughput sequencing technologies. For our study we used DNA extracted from bumble bee species from Mexico and Central America. Following library prep by the company Novogene, the Illumina NovaSeq platform was used to sequencing the DNA libraries for each sample. Once the libraries were sequenced, we used a suite of tools within the genetic analysis software Geneious to build the genomes. We will present in detail the methods and process (i.e. the pipeline) we used to build these genomes and on the many applications and questions that can be addressed with whole genome data.

20. Assessing the effectiveness of traditional plant-based medicines in lowering blood glucose levels using a mouse model.

Carter Cavalier
Environmental Science
Faculty Advisor(s): Dr. Michelle Duennes
A.J. Palumbo Student Research Endowment

Diabetes, a metabolic disease stemming from elevated blood glucose levels, affects approximately 2.8% of the global population, projected to rise to 5.4% within the next couple of years (Kooti et al., 2016). Insulin deficiencies, either due to pancreas malfunction or ineffective metabolism, contribute to its onset. Traditional plant-based medicines have been used across cultures to manage diabetes, but these can vary in their effectiveness based on compounds present within the plants and how they are preserved. Using *Murraya koenigii* and *Catharanthus roseus* extracts on blood glucose and ketone levels, an experimental design involving male and female mice was conducted to evaluate the effects of each plant. Eight groups were established: four control groups, two groups receiving *C. roseus*, and two receiving *M. koenigii*. Brewed tea containing these extracts was administered through water bottles, with daily measurements of consumption rates. Additionally, twice a week, urine samples were collected from mice for blood glucose and ketone level assessment using keto-diastix strips. At the conclusion of the experiment, blood samples were used to measure blood glucose levels. Understanding the effectiveness of traditional medicines like these is crucial for developing reliable and accessible treatments for diabetes, which remains a significant global health concern.

21. Limb regeneration and growth of salamanders as affected by stream pollution

Bridgette Gorg
Environmental Science
Faculty Advisor(s): Dr. Michelle Duennes
A.J. Palumbo Student Research Endowment

Stream pollution is extremely common and comes from a variety of causes, including acid mine drainage, agricultural sources of pesticides and fertilizers, and environmental pollutant crises. The overall ecological health of stream habitats that have been contaminated by pollution has been proven to be detrimentally affected. In addition to being vital members of an ecosystem by being a sensitive indicator species,

salamanders provide many benefits to their environment as an integral unit of the ecosystem resilience-resistance balance, functioning as environmental equalizers. Using axolotls as a research model, these fully aquatic amphibians were exposed to a variety of common environmental pollutants and the regenerative capabilities of their limbs were tested, recorded, and compared to a control group that was free from pollution exposure. This was tested in juveniles by surgically removing a selected toe on each individual and measuring how long the limb took to re-grow, and in hatchlings, their overall body growth was measured. This research project provides vital ecological insights into the broad scope repercussions of stream pollution, as well as more narrow results on the salamanders themselves. Salamanders are in dire need of conservation aid, and taking steps to combat pollution, a main source of their endangerment, is crucial towards their preservation.

22. BackBlog: Social Movie Playlist App for iOS and Android

Nick Abegg, Jake Buhite, Tom Krusinski, Josh Altmeyer, Christian Totaro
Computer Science
Faculty Advisor(s): Dr. William Birmingham

BackBlog is a cross-platform application for iOS and Android designed to revolutionize how movie enthusiasts create, share, and discover film playlists. It blends the personalization of movie watching with the dynamics of social connectivity, allowing users to navigate through an extensive database for new discoveries and to engage with a community of similar interests. This research evaluates BackBlog's impact on social movie engagement and its role in streamlining the film discovery process. The app's development was guided by user feedback, aiming to cater to the evolving needs of the film-loving community and to encourage the collaborative curation of movie content.

23. Creating a Responsive Bakery Website Utilizing Flask and Firebase

Benjamin Hill, Patrick McDonagh, Daniel Cocca, Justin Fallat, David McDade
Computer Science
Faculty Advisor(s): Dr. William Birmingham

The monks at Saint Vincent Archabbey have a longstanding tradition of milling flour and baking bread. To help revitalize this tradition, Brother Angelo, a monk recently appointed as the monastery's lead baker, has made great strides in growing an increasingly large base of loyal customers. This has been accomplished largely by word of mouth, but also through the use of social media platforms such as Facebook and Instagram. While these platforms have been useful in advertising the Archabbey Baked Goods brand, orders are done strictly through a mailing list, as there is no dedicated website or online store.

Our senior project team, New Doughmain, seeks to remedy this, by providing a dedicated website for customers to view information about Archabbey Baked Goods, browse products, and provide a dedicated place to order for upcoming bake sales. Utilizing Flask, a popular Python library for web-development, we were able to create a responsive website hosted on Google Cloud Run, with a Firebase backend for database access and authentication. This allows for Br. Angelo or another administrator the ability to add/delete products, coordinate bake sales, and download orders. When submitting an order, our site offers customers the option of either paying in person on the date of the sale, or prepaying for their order utilizing Stripe, a popular online payment portal.

24. Open Rooms- Room Occupancy Detection

Roman Morasco, Aiden Buterbaugh, Cole McNeil, Jacob Chadwick, Adam Droske
Computer Science
Faculty Advisor(s): Dr. William Birmingham
A.J. Palumbo Student Research Endowment

We are Open Rooms and the purpose of our project is to create a system to easily determine whether a study room in Dupre is occupied or not. After extensive user testing, we have found that the current system requires users to individually search each study room that they wish to use to check its occupancy. This leads to a waste of the user's time if all the study rooms in Dupre are occupied. To solve this issue, we developed a system where users can check a room's availability before deciding if they need to walk through the pouring rain or not. Our system consists of an iOS app and a motion detector. The app shows a list of rooms and their availability. It also has a map and can display historical occupancy data on a per-room basis. The motion detector was built using a small computer called an Arduino. The Arduino has multiple different types of sensors on it that can detect if a room is occupied or not. It is important to note that there is no camera on the Arduino in order to protect user privacy. The Arduino and the sensors are enclosed inside of a "box" that will sit in the entry way to each room. The Arduino is what lets the app know whether to display a room as occupied or not.

25. Folklore in Irish Pubs

Jacob Devlin
Art Administration in Performing Arts/Art Education/Art History
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

The Irish Pub is a notable cultural feature both in Ireland and worldwide. And after traveling to Ireland with the Irish Folklore class I spent a notable amount of time trying the capture the atmosphere of the Pubs and trying to put together a clear story of their place in history. Their cultural significance and their impact on things what we experience daily here in the US. Whether it be common phrases that have emerged or, not able advertisements that we still make reference to. The project will showcase my journey with pictures from the notable pubs distilleries and breweries that we visited as well as recounting notable folklore surrounding Irish Pubs. Even some of the unspoken cultural practices that occur and the origin of these traditions.

26. Animating Ireland's Future

Alex O'Connell
Digital Arts and Media
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

Storytelling is important to Irish culture and expanding those stories through technology is key. From humble beginnings of oral and written tradition Ireland has expanded to digitize the stories and culture with the embrace of technology. By expanding the knowledge of Irelands history and their stories through digital arts will help the world understand Irelands culture and traditions better.

27. Folklore and The Rock of Cashel

Riley Chase
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

The Rock of Cashel is not only historically significant to Irish history as the high seat of the Kings of Munster for several hundreds of years, but it also contributes to Ireland's deep history of folklore. Whether it be the origin of the structure itself or the benefits of touching your fingers around the cross on the grounds the Rock has deep roots in Irish folklore.

28. Dust Busters: Task Analysis and Career Development in Retail

Jacob Crumling, Austin Hall
Education, Disability Studies
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

One student in the Bearcat BEST transition program at Saint Vincent College has expressed the desire to become independent in the workplace. In order to gain the necessary skillset, the student worked in the Saint Vincent College Bookstore under the supervision of job coaches. During this project, job coaches have been tracking her progress through data collection and task analysis. Our goal as job coaches was for the student to have the ability to work independently and effectively at any future workplace from their experiences gained through working at the bookstore.

29. Excel Excellence: A Case Study in Data Entry Instruction

LidaMarie Frezza, Addison Carbaugh
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

This single case study observed and supported a student within the Bearcat B.E.S.T. program to learn and maintain skills at a job within the local community using task analysis. Task analysis supported the student in learning data entry within the company's system successfully. Our instructional plan, using feedback and task analysis, supported the student's learning of computer data entry. The student mastered the initial skill set within 8 instructional sessions.

30. Two New Doping-Free Manufacturing Processes for Bread-Derived Carbon Electrodes with Control over Surface Features and Topological Patterns

David Bujdos
Engineering
Faculty Advisor(s): Dr. Adam Wood
2023 3-Minute Pitch Award

Pyrolyzed carbon electrodes (PCEs) can serve as sustainable alternatives for electric components, but it is difficult to control their surface geometries during this semi-destructive process. Impressive contributions have been made to the field of PCE fabrication in terms of the nanoscale, functionalization, and separation applications; however, further progress towards an emphasis on a sustainable life cycle is the next step forward. Two new methodologies for creating sustainable PCEs are proposed here: stamping, where a user-designed, 3D printed electrode precursor (EP) imparts a shape on an organic material, and reconstitution, where the same EP acts as a mold as a mixture of agitated organic material and water dries to leave behind a rigid shape. Both methods allow for the reuse of the EP, the upcycle of biologically-derived waste products as a pyrolytic input, and do not require chemical modification. A comparison of

the two methodologies is discussed as surface features of PCEs scale by a factor of 0.78 during the reconstitution process and by a factor of 0.68 during the stamping process yet maintain defined structures on the microscale and demonstrate previously unachievable resolution to the naked eye prior to these two novel pathways.

31. Design and Fabrication with Modern Materials (ENGR 328)

Frank Startare, Brandyn Brock, David Bujdos, Collin Frydrych, Mark Grenchik, Bradley Hallick, Morgan Klingeman, Andres Mateos Carrion, Adam Wood
Engineering
Faculty Advisor(s): Dr. Adam Wood

Design and Fabrication with Modern Materials is an engineering class that exposes students to a wide range of rapid prototyping techniques and manufacturing processes. Students use advanced computer modeling, 3D printing, laser cutting, molding and casting, and thermoforming to manufacture a number of different products. Students will display select projects at the Academic Conference.

32. Development of a Plant Chip System for Root Decision Making

CJ Ciecierski, Elizabeth Dudley
Engineering
Faculty Advisor(s): Dr. Adam Wood

Plants are complex living organisms that respond to various stimuli daily. One way in which plants can interact with their surroundings is through their root systems. Root systems are integral to plants because they allow the plant to absorb the necessary nutrients for growth. Therefore, plant roots have been shown to grow in, around, and through various obstacles in order for the plant to survive. One question, however, is how do plant roots know where to grow. Plant roots are difficult to study due to their presence in the ground and complexity of the environment in which they live. As a result, there are hundreds of factors that influence how they may grow. This research aims to develop a systematic system in which plant root decision making can be studied when roots are exposed to a wide variety of stimuli. Currently a system for studying how light influences root decision making is being developed.

33. Material Image Analysis

Antonio Scalamogna
Engineering
Faculty Advisor(s): Dr. Adam Wood

In the engineering world, the materials we use matter as every material has different properties. Each piece can break in two ways and affect how the materials are used. We can calculate the area of a break between these two types of breaks by the shade of the material left behind. These are normally done by hand so this research project is making this process easier and more efficient. I am designing and coding a device to detect an object and scan it with a camera which then applies a filter to the photo and reads out image data of how much of the material broke to a specific break. This involves using a Raspberry Pi 4, which is essentially a mini-computer, a touch-screen monitor, a camera, and an infrared laser. Using python, I am coding the essentials to make this device do the necessary processes for image analysis to accurately calculate the area of the breaks and save them in a file to be reviewed if needed after the information has been read out.

34. Autonomous Object Avoidance System

Alek Gmuer, Mitchell Tryon
Engineering
Faculty Advisor(s): Dr. Michael Robinson

This project aims to understand how autonomous cars attempt to avoid pedestrians crossing a road. The project uses a modified remote-control car in a laboratory apparatus to simulate this scenario. The vehicle is operated through IR senders and receivers that are connected to two separate Arduino boards. A camera is calibrated to find the specified location of the vehicle and anything within the apparatus using color. This design achieves the goal of developing a reliable source of to gather data about an Autonomous Object Avoidance System.

35. Visuospatial Ability, VBMRT Realism, and Stereotype Threat: An Exploration of Sex Differences in Mental Rotation

Helen Kish
Psychological Science
Faculty Advisor(s): Dr. Mark Rivardo

Gender differences favoring men have commonly been found in visuospatial abilities. However, recent research suggests that these sex differences might be lessened or even completely diminished when the stereotype is nullified or when the visuospatial stimuli are of a more realistic nature than the isometric drawings on the classic Vandenberg Mental Rotation Test (VBMRT). I will analyze how VBMRT scores differ between genders across realistic or unrealistic stimuli and three stereotype threat conditions. I will use the original VBMRT drawings and realistic photographs of wooden block models as stimuli. The stereotype conditions presented to participants include implicit, explicit, and intervention. Participants will be presented with the common stereotype of men outperforming women in visuospatial tasks either implicitly or explicitly, or participants will learn about stereotype threat and how it can cause anxiety that lessens performance regardless of skill level or intelligence. VBMRT score will be measured before and after the stereotype condition is presented for a within-subjects analysis. Additionally, I will be creating a measure of visuospatial experience. I will conduct a factor analysis and use those factors as covariates. Examples of factors include: action video game experience, mathematical experience, and sports experience.

36. The Association of the Coach-athlete relationship with Athlete Motivation and Athlete Satisfaction

Hannah-Marie Starner, John Evans, Andrew Stano
Psychological Science
Faculty Advisor(s): Dr. Mark Rivardo

In the following study, students were surveyed (athletes and non-athletes) on their perceptions of coach-athlete relationships (CARs) and athlete motivation/satisfaction. The survey questions given to participants were taken from the CART-Q (Jowett & Ntoumanis, 2004), SMS-II (Pelletier et al., 2013), and the Satisfaction Scale (Judge et al., 1998; Jin et al., 2022). Using the 3Cs (closeness, commitment, and complementarity) that the CART-Q (Jowett & Ntoumanis, 2004) was modelled from, we analyzed their association with motivation and satisfaction from athletes directly as well as non-athletes on their outsider perceptions. In the following study, it was hypothesizedthat as a participant’s scores of the 3Cs increase, motivation and satisfaction scores will increase. Results show a significant regression for CARs and athlete motivation as well as satisfaction. It was also found that non-athletes agree that commitment could influence and athlete's satisfaction.

Posters: Session 2

1. The Festival of Flowers

Joseph Valenty
Modern & Classical Languages
Faculty Advisor(s): Dr. Juan Carlos Rivas

The *Feria de las Flores* or Festival of Flowers is an important tradition in Colombia. It celebrates the Battle of Boyac which was the most important battle in securing independence from Spain. The celebration started in 1957 with a small number of people involved. After 2 years of cancellations, the festival became what it is today. The festival is five days long and celebrates many different parts of the rich Colombian culture. Live music, traditional dishes, games, and artwork are integral to the festival. However, the flowers themselves are what make the celebration iconic. The Silleteros carry many artworks made completely of flowers, through generations for some of these families. Domestic and foreign flowers are made into these diverse artworks. These are put on display for viewing throughout the celebration. Overall, the Festival of Flowers is a grand microcosm of the cultural and natural diversity of Colombia as a whole.

2. The Myths and Legends of Saint Patrick

Noah Goehring
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

Saint Patrick's influence on Irish childhood culture is profound, blending historical accounts with captivating folklore. Despite sparse historical details, legends of banishing snakes and using the shamrock to explain how the Trinity has become integral, inspiring generations with tales of miracles and triumphs. From having Sadie to being the forerunner of bringing Catholicism to Ireland to fun Saint Patrick's Day festivities, Saint Patrick’s identity is one of many twists and turns. To analyze the connection between the historical Saint Patrick and the modern legend of Saint Patrick, I investigated documents pertaining to the history pertaining to Saint Patrick’s impact on the Irish culture, I observed monuments and artifacts dating back to periods of his time in Ireland, and I also researched several Irish legends surrounding the folklore of Saint Patrick. From these methods, I conclude that the vague history and timeline of Saint Patrick does not align with the characteristics and mannerisms of the multiple myths of Saint Patrick. However, regardless of historical accuracy, I have found that the Irish folklore and stories of Saint Patrick deeply support the development of a uniquely Irish identity for not only the adults, but especially the children. His lore continues to shape the hearts and minds of the youth, instilling within them a deep sense of faith, cultural heritage, and moral values.

3. Fitness Fun: Task Analysis Instruction in Vocational Training

Lily Holsey, Sophia Dobransky
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

A student in the Bearcat BEST transition program at Saint Vincent College has expressed wanting to join the workforce setting upon graduation. To gain the necessary skills and experience, the student worked in the Saint Vincent College fitness room. This project requires direct instructional models to collect data and track the student's progress to monitor their independence. Our goal for the student was to take the skills they have learned in the fitness center for future occupational opportunities and gain independence through their experiences.

4. Communication Building Skills in a Student's Life

Samantha Lantz
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

A Multi-Step Plan was implemented in the workplace to evaluate the impact of basic communicating skills with a 20-year-old male with ADHD and Autism NOS. Our goal during this project was to get the student to reply in full sentences instead of one-word sentences. These skills will help the student learn communication skills in and outside of the workplace.

5. Working Towards Success

Emma Morgan
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

A student in the Bearcat BEST program at Saint Vincent College is learning skills in retail that they can use once they graduate. To get real-life experience, the student has spent the semester working at the SVC Bookstore. Under the guidance of a job coach, the student follows instructional methods to track their progress. The goal is for the student to gain independence and to learn skills that will help them be successful in their future job opportunities.

6. Caring for Critters: Turtles, Frogs, Bugs, and More!

Allison Prady, Mary Claire Petruska
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

A student in the Bearcat BEST transition program at Saint Vincent College has expressed the desire to work as a veterinary technician. Along with working on his farm at home, the student gained specific skills and experience while working at Winnie Palmer Nature Reserve under the guidance of a job coach. This project used task analysis and modeling to teach the skills required to care for the animals, and data collection to track the student’s progress over time. Our goal was for the student to generalize care skills to various species.

7. Shaping Language: Task analytic Instruction in an Autism Support Classroom

Andrew Swauger
Education
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

A Student in the autism support room at McCullough Elementary was having trouble with basic expressive language. This is a skill that has been processed by most students his age and remains important to continuing education in every subject throughout the primary years. The parents and lead teacher of his classroom have asked that this skill be taught.

Being able to name parts and features of objects, pictures, or actions in the classroom has been recognized as an imperative goal for J.S. to develop in a classroom setting. Data collection and instruction were completed in the autism support classroom. The goal of the instructional plan was to have J.S. be able to express his observations through descriptive thoughts and wording.

The objective of the research done during this intervention was to increase the student's ability to use expressionistic language. The expressionistic language that the student used was all in his vocabulary from the start, this intervention allowed him to be able to use that vocabulary to its fullest extent in the classroom. The student can use these things that he learned for the betterment of his observational skills for the rest of his educational years.

8. The Heart and Hands of Ireland

Emma Denne
History
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

Coming from an Irish American family, I have developed a familiarity with the Claddagh ring. I was gifted one for my eighteenth birthday two years ago. I had the opportunity to visit the region where the ring was created located near Galway, Ireland during Spring Break this semester. The ring dates to the 1700s and was created as a gift for a local of Galway. The ring is still widely worn today as a wedding band and some families use the ring as a family heirloom. The ring symbolizes the friendship, love, and loyalty of those who wear the ring. The symbolization of the ring can be connected to the ancient celts and the territorial fisherman of Claddagh.

9. Irish Cuisine

Ethan McClain
History
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

This project delves into the complex domain of Irish cuisine, examining its historical roots, contemporary evolution, and prospects within the framework of tradition, innovation, and sustainability. Irish cuisine, often underappreciated due to stereotypes and misconceptions, possesses a rich tapestry of culinary traditions that are deeply intertwined with Ireland's cultural heritage, agricultural landscape, and social dynamics. Through a thorough exploration of historical texts, culinary archives, and ethnographic studies conducted during a retreat in Ireland, this project aims to unravel the intricate layers of Irish cuisine and shed light on its diverse influences and regional variations.

10. Portal tombs, passage tombs, and their significance

Kelsy Levendosky
Liberal Arts
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

A major aspect of Irish folklore, such as in traditional legends, includes a rich description and details of land and nature. Folklore, connects the many landmarks and natural aspects of landscape to the Celtic ideas of passageways and otherworldliness. This project will investigate the significance of important landmarks in Irish folklore with the traditional teachings and stories that children learn up to the present times, in which they learn the value of self-appreciation and authenticity. This project will include fieldwork conducted in Ireland with a group of approximately 15 students, visiting many cities including Dublin, Galway, Letterkenny, and Sligo. Throughout the trip, the students visited multiple ruins and sites dating back to approximately 20,000 years ago which remain symbolic of the beliefs and stories passed down through generations today.

11. Celtic Crossroads: The blending of Christianity with traditional Irish culture

Julianna Lott
Liberal Arts
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

Christian values and traditions have had an immense impact on Irish culture and folklore. This religion is vividly displayed throughout Ireland in the form of abundant churches, religious shrines, Celtic crosses, and religious artwork. However, before Saint Patrick's missionary work, Ireland was predominantly a pagan nation. Therefore, although Ireland became Christianized, some of these pagan traditions and values remained. So, over the centuries, Irish culture has been shaped by the blending of Christianity with pagan folklore. During my time in Ireland, this blending was very evident within various settings. For example, Christian artifacts such as the Book of Kells and the Knock shrine commemorating the Apparition of the Blessed Virgin Mary receive much recognition and appreciation. However, alongside these relics, fairy trees and portals are still recognized, and pagan legends continue to be passed down. This blended culture has a great influence on Irish childhood. Many children are taught Christian values from an early age while also being told legends about fairies and witchcraft. Overall, this combination of Christianity with traditional Irish folklore results in the vibrant and unique culture of Ireland.

12. The Impact of Music on Irish Folklore and Culture

Malley Kotula
Core
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

This project will focus on the influence of music in the Irish culture and how it helps to transmit folklore. Experiential evidence was gathered from my trip to Ireland, and I will be reflecting on the musical experiences I had, as well as the impacts of music that I learned from locals.

13. Sports in Irish Culture

Jakob Krumenaker
Core
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

A presentation examining how sports have influenced and shaped Irish culture throughout history. Since the 17th century, Irish people have used sports as a symbol of nationalism and pride. This presentation will examine the significance of this pride historically, as well as discuss the significance of sports in Irish culture today.

14. Gaelic Heroes on the Pitch

Tyler Martin
Core
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

My name is Tyler Martin, and I am a junior at Saint Vincent College studying Financial Mathematics. On our class trip to Ireland for Irish Folklore, I analyzed and collected artifacts involving Irish sports and the culture surrounding it. Several sports are deeply ingrained into Irish identity, as reflected in Irelands history and its present day. Much folklore, written or otherwise, highlight the importance of sports within the rich Irish culture. This importance was abundantly evidenced as we navigated around much of the island of Ireland, most especially among the country's youth and within pub culture.

15. A Woven History

Alyssa Morgan
Core
Faculty Advisor(s): Fr. Philip Kanfush O.S.B., Mr. Shannon Jordan

The Aran sweaters serve as a representation of Irish folklore and tradition. Intricate knit patterns offer symbols important to life on the Aran Islands. The sweaters are more than an article of clothing and reveal a subculture and a history of a unique people. Through document analysis, interviews, and onsite visit to the Aran Islands this author explored the rich tradition of the Aran sweater.

16. The Importance of Alcohol to Ireland's Cultural Identity

Gavin Louch
Anthropology
Faculty Advisor(s): Fr. Philip Kanfush O.S.B.

In Ireland, observations were made to understand the important connection between the country of Ireland and alcohol. Ireland is known to be a very wet country and has thus created itself an identity around alcohol. The country was once the world's leading whiskey maker in the world and even after continuous turmoil it has always strived to become that leader once again. How has Ireland regained its alcohol identity? By touring numerous distilleries and experiencing drinking culture it can be noted that the country holds this specific identity high. In addition to physical production, alcohol has references in many stories, traditions, folklore, and tales that originate in Ireland. The goal of my observations is to create an understanding of the importance that alcohol has on Ireland in all different facets.

17. Self-Competence in Relation to Gender-Stereotyped Tasks

Kaley Lazere, Celena Colcombe, Perpetua Fischer
Psychological Science
Faculty Advisor(s): Dr. Brandi Klein

The purpose of this study is to assess whether self-competence is affected by tasks that are typically gender stereotyped. Participants completed a survey in which they were presented with tasks and asked to rate their self-competence on a 5-point Likert scale. The survey included female-stereotyped, male-stereotyped, and neutral tasks. We predicted that male participants would rate themselves as more competent in the male-stereotyped tasks; female participants would rate themselves as more competent in the female-stereotyped tasks; and for the neutral tasks, both male and female self-competence ratings should be equal. The results of this experiment are described and expanded upon later in this presentation.

18. The Effect of Gender and Relationship Status on Mood after Viewing Sad Film

Isabella Lodovico, Dominick Spence, Haleigh Fellers, Amara Jones
Psychological Science
Faculty Advisor(s): Dr. Brandi Klein

The purpose of this study was to see what effect gender and relationship status would hold on someone’s mood when viewing a sad movie clip. Participants from a small, catholic, liberal arts college filled out a survey and viewed a movie clip, after which they reported their mood on the Profile of Mood States (POMS) scale. Each participant filled out a Qualtrics survey which contained a sad movie clip from the film The Notebook and then rated their mood on a five-point Likert scale assessment containing emotional adjectives. We predicted that the participants who were female and reported single would have lower

reported moods on the POMS scale than females that reported taken and males regardless of relationship status. This presentation contains the results from this research.

19. Differences in Student Perception of Alcohol as a Function of Familial Alcohol Use

Olivia Sullivan, Samuel Taleff, Maritza Artiga, Kelcie Herrmann
Psychological Science
Faculty Advisor(s): Dr. Brandi Klein

The purpose of this study was to evaluate the difference in perception of alcohol between participants who came from families with moderate to high alcohol use and participants who come from families with low to no alcohol use. This study sought to contribute to the understanding of how familial alcohol habits influence individual attitudes, beliefs, and experiences related to alcohol consumption. By conducting this research, the aim was to provide valuable insights that inform interventions and strategies aimed at reducing alcohol-related harm, particularly among populations with different familial predispositions to alcohol use. Our participants answered questions assessing the level of familial alcohol use. Their score sorted them into our two-level variable structure, which included moderate to high familial alcohol use or none to low familial alcohol use. Participants then answered questions assessing social ease, unease, and economics related to alcohol use. We predicted that the perception of alcohol of participants who came from families with moderate to heavy alcohol use would be more positive compared to participants who came from families with low to no alcohol use. Results will be forthcoming.

20. La Novena de Aguinaldos

Bella Baumgardner
Modern & Classical Languages
Faculty Advisor(s): Dr. Juan Carlos Rivas

A famous holiday in Latin America known as La Novena de Aguinaldos is celebrated the nine days leading up to Christmas. This holiday primarily revolves around the Catholic religion within people of Ecuador, Venezuela, and Colombia. During this holiday families gather together and sing various songs, share stories, play games, and spend time with each other during the holiday season. There is a prayer book for this holiday which family members take turns reading from each night and as the nine days progress a new part of the story is revealed. Each of the nine days has a different theme including Comprehension and Respect for example. While each day has a theme, the theme corresponds to the reading from the prayer book that each family member takes turns reading from. Families enjoy singing and dancing during this holiday as well as partaking in different foods that are special for this holiday.

21. The Carnival of Barranquilla

Aiden Bewick
Modern & Classical Languages
Faculty Advisor(s): Dr. Juan Carlos Rivas

The Carnival of Barranquilla, a longstanding tradition in Colombia and one of the world's largest festivals, attracts people globally to experience its rich culture. It is recognized as a Cultural Masterpiece by Colombia's Congress and UNESCO, embodying a mix of indigenous, African, and European influences, showcased through vibrant music, dance, and festivities. Originating in the late 19th century, the carnival's history reflects Colombia's diverse cultural heritage, with iconic elements like *La Marimonda*, *Cumbia*, and the *Batalla de Flores*, all highlighting its cultural depth and significance. This celebration promotes cultural unity, pride, and understanding, breaking down societal barriers and fostering appreciation for Colombia's

diverse heritage. In a world marked by division, the Carnival of Barranquilla stands as a transformative experience, encouraging acceptance and celebration of cultural diversity.

22. Inti Raymi: The Celebration of the Incan Sun God

Alyson Krecota
Modern & Classical Languages
Faculty Advisor(s): Dr. Juan Carlos Rivas

Inti Raymi is a vibrant and colorful festival that is celebrated in Peru. Also known as the Sun Festival, Inti Raymi is a celebration of the Incan sun god, Apu Inti. Apu Inti is found at the center of Incan religion and culture. The festival has deep roots in Incan and Peruvian culture with the first festival occurring in 1430 AD. Today, Inti Raymi is still a significant part of the culture and history of Peru, and the festival continues every year. In present day Peru, Inti Raymi is celebrated with music, performances, and ceremonies. The festival attracts both locals and visitors to Cusco, Peru every year. After nearly six hundred years and many generations of Peruvians, Inti Raymi has continued be a treasured piece of Incan and Peruvian history and culture.

23. Día de los Muertos

Caleb Leechalk
Modern & Classical Languages
Faculty Advisor(s): Dr. Juan Carlos Rivas

This report describes and explains the well known Mexican holiday named the day of the dead. It usually spans from October 31st to November 2nd. The holiday and its traditions date back to Mesoamerica where it was first started by civilizations such as the Olmecas, Toltecas, and Mayans. The main aspect of this holiday is for families and friends to welcome back the souls of ones they have lost. Described in this report are the manners in which people choose to celebrate their loved ones, some of these include the decoration of altars, bringing of food and drink, and the enjoyment of being gathered together and remembering the lives of the deceased. This report aims to help in the understanding of the importance of this time honored holiday as well as the different ways in which it is celebrated and how it has grown to be shared throughout the world today.

24. The Harmful Effects of Human Trafficking and the Proposed Efforts of Prevention

Cera Hissem
Criminology, Law and Society
Faculty Advisor(s): Dr. Kayla Jachimowski

Human trafficking has approximately 68,000 new victims every single day (Kessler, 2018). With that amount of people falling victim to this crime there has to be an effort in order to prevent it.

Educating people on how big of a problem this is worldwide is crucial to the public conception of this crisis. While educating the general public, there should also be steps towards educating immigrants. Educational classes could be created so that they are able to learn the language and the rights while being a resident in America (Clawson et al, 2008). Along with the immigrant courses, there could be educational workshops for the general public talking about the warning signs of trafficking.

Having these educational workshops in place would allow the public misconception to be changed. Often, the public conception of human trafficking is someone in a white van with candy which is far from the truth.

25. Approaches to Treatment of Post-Traumatic Stress Disorder

Allison Berner
Health Science
Faculty Advisor(s): Dr. Caryl Fish

Post-Traumatic Stress Disorder (PTSD) is a complex psychological condition that can develop in individuals who have experienced or witnessed a traumatic event. Chronic stress leads to structural and functional alterations in the traumatized brain. PTSD stands as a profound testament to the enduring impact of trauma on the human psyche. Defined by a complex interplay of emotional, cognitive, and physiological responses, PTSD emerges as a psychological condition triggered by exposure to intensely distressing events. While commonly associated with military combat, PTSD can affect anyone who has experienced or witnessed a traumatic incident, ranging from natural disasters and accidents to instances of violence and abuse. To combat PTSD, various psychotherapies and pharmacotherapies provide relief to those who are suffering. Both are intended to lessen the burden of trauma, but it is important to do research on personal effectiveness of each method. Psychotherapies are intended to help a person identify and change troubling emotions, thoughts, and behaviors. They go from a more holistic perspective focusing on the showing an individual how to power through triggering times. The goal of pharmacotherapies is to minimize intrusion and hyperarousal symptoms in a way that rewires the brain to be a certain way. PTSD and various treatments go hand-and-hand and vary by individual.

26. Comprehensive Community Health Education Project at the McKenna Senior Center

Savannah Peterson, Sarah Martin, Anne Deforest, Lauren Troiano, Kelsy Levendosky, Christina Mulloy
Nursing
Faculty Advisor(s): Mrs. Mary Fran Reidell MSN, RN

The purpose of this comprehensive community health education project (CCHEP) is to provide pertinent health education to the older adult members of the McKenna Senior Center located in Greensburg, PA. This clinical rotation took place from January to April 2024 – this project was completed incrementally during that timeframe by student nurses.

27. Alaskan Fisheries Internship

Bridgette Gorg
Environmental Science
Faculty Advisor(s): Ms. Tammy Elliott

During Summer 2023, I was employed as a Fisheries Intern at Lake Clark National Park. My job was to monitor and enumerate the sockeye salmon run as they migrated from the oceans back to the very same streams where they hatched to spawn. I spent my weeks traveling by boat and float plane to various locations where the sockeye run was occurring. Once at these rivers, I would set up my back country camp, setting to work to count the salmon that swam up the waters. At my locations on the Newhalen River, I was able to work nearby a native Athabaskan village, where the people fished for enough salmon to smoke and dry to last their families for the entire year. At my location on the Telaquana River, I was in a more remote location than I have ever been before, and I spent three weeks living on an island after being dropped off there by a float plane. There, I was able to count a record-breaking sockeye salmon run, counting tens of thousands of salmon every hour. This internship reinforced the importance of yearly ecological cycles present in the environment to me.

28. MIDSX: A Monte Carlo Interaction and Dosimetry Simulation of X-rays

John Meneghini
Physics
Faculty Advisor(s): Fr. Michael Antonacci, O.S.B.

Computed Tomography (CT) imaging, while essential for diagnostics, exposes patients to ionizing radiation. To accurately quantify radiation dosage, this study introduces MIDSX, a specialized open-source Monte Carlo (MC) photon transport code system for medical imaging. Unlike general purpose particle transport MC systems, MIDSX is tailored for x-ray transport, offering more streamlined implementation. Results from validation simulations show MIDSX's results for specific cases agree to within 0.39% of the mean of established reference data. However, discrepancies in body energy deposition measurements, reaching up to a 6.3% mean percent error, indicate areas for further refinement in the system.

29. Influence of Temperature and Precipitation on Gamma-ray Flux

Matthew Vanden Berk
Physics
Faculty Advisor(s): Fr. Michael Antonacci, O.S.B., Dr. Daniel Vanden Berk, Dr. David Grumbine

The operating temperature, as well as the intensity of precipitation, were observed to greatly impact the gamma-ray flux measured by Cosmic Watch detectors. The temperature dependence of the detectors is assumed to be caused by the internal electronic components, and a correction factor is derived. The effects of precipitation on the detectors in caused by a phenomenon called "radon washout", and requires further investigation.

30. Marketing Ice Arena

James Bendtsen
Marketing
Faculty Advisor(s): Dr. Annie Laurie Nichols

I have worked an internship at an Ice Arena this past school year and will present about my experiences.

31. Exploring Geometric Sensitivity of Organic Scintillator

Coty Walters, Matthew Vanden Berk
Physics
Faculty Advisor(s): Dr. David Grumbine, Fr. Michael Antonacci, O.S.B., Dr. Vanden Berk

The Cosmic Shower Detector Array (CSDA) project aims to characterize and calibrate muon detectors for utilization in small array detection fields. The detectors use an organic scintillator to detect radiation, generating a voltage output that corresponds to the radiation's energy. This experiment aims to explore how the geometry of incoming radiation affects the voltage output in the scintillating material.

32. Using Polymeric Coagulants to Remove Iron and Aluminum from Wastewater to Create a Safe Drinking Source

Leo Iacovangelo
Chemistry
Faculty Advisor(s): Dr. Daryle Fish

The purpose of this study is to determine if polymeric coagulants are able to remove particulate iron and aluminum from abandoned mine drainage and a local stream. Coagulation using polymeric coagulants has not been extensively investigated and their use may significantly increase the water quality. The flocculation properties of the polymeric coagulants will be investigated using different pH levels and ionic strength. Iron and aluminum analysis will be performed using the MP-AES spectrophotometer.

33. Synthesis and Characterization of Metacetamol Derivatives

Zach Kuvinka
Chemistry
Faculty Advisor(s): Dr. Jason Vohs

Acetaminophen is a widely-used and marketed drug due to its analgesic properties. Metacetamol is a lesser studied isomer and is a minor product in the initial synthesis of acetaminophen. Herein, we report the synthesis and characterization of acetic acid and ester acid derivatives of this compound that may also have desirable analgesic properties.

34. Stress Resistance in Chemotaxis mutants of Azospirillum brasilense

Katelyn Stokan
Chemistry
Faculty Advisor(s): Dr. Jennifer Koehl

Bacteria are found everywhere, including the soil where bacteria can adhere to plant roots and promote growth. Conditions, however, are not always optimal and can lead to a bacterial-stress response. *Azospirillum brasilense*, a plant growth-promoting bacterium, has a chemotactic pathway to navigate towards beneficial conditions and away from harmful ones. Preliminary evidence indicated that chemotaxis mutants have increased resistance to stress, but it is still unclear how the stress and chemotactic pathways intersect. Therefore, this research investigated the effects of stressors on chemotactic mutants. Cell viability was measured after exposure to acute and long-term stress conditions. Generally, for the acute conditions, higher stress resulted in decreased cell viability, except for cheY7 mutant. Under long-term salt stress, only cheY4 and Sp7, the wildtype, showed resistance. This may indicate that CheY7 plays an additional role in regulating cell stress, in both acute and long-term conditions. Overall, this research suggests that that some mutants handle stress better than others, and this information can help the understanding of the relationship between stress and chemotaxis.

35. The Bose-Hubbard Model and Machine Learning

Will Mallah
Physics
Faculty Advisor(s): Fr. Michael Antonacci, O.S.B.
NSF Grant

Entanglement entropy is a useful quantity for implementation of quantum computers and for characterizing phase transitions in quantum matter. However, in larger systems, exact computation becomes difficult as the Hilbert space, describing identical particles on a lattice, grows exponentially with the system size. Therefore, stochastic methods such as the Path Integral Ground State quantum Monte Carlo for Lattice Implementations (PIGSFLI) algorithm are needed. By comparing results between exact diagonalization calculations and that of the PIGSFLI algorithm, we show that quantum Monte Carlo is capable of accurately predicting several properties for small-scale, ground state Bose-Hubbard systems. We calculate entanglement entropy via exact diagonalization for both spatial and particle bipartitions of

two particles on two sites described by the Bose-Hubbard model and compare the spatial results to those obtained from the PIGSFLI algorithm. Benchmarking how this algorithm operates for small-scale systems, which can be determined by exact diagonalization, provides a route to the accurate simulation of larger systems with a significant reduction in computational cost. Additionally, information on machine learning and its future applications to this project will be discussed.