CELEBRATION OF

SCHOLARSHIP & CREATIVITY

WORCESTER STATE UNIVERSITY

2020

CELEBRATION OF
SCHOLARSHIP
& CREATIVITY

Welcome to the 2020 Worcester State University Celebration of Scholarship and Creativity.

Because of the stay at home protocols necessary to fight the COVID-19 pandemic, the Celebration moved from its usual format of oral presentations, exhibitions, performances, and poster presentations to a virtual format. Worcester State is tremendously excited to continue this tradition and recognize the great achievements of our students and their faculty advisors through virtual projects available at:

https://worcester.swivle.cloud

The password for entering the Celebration site is:

worcester20

The virtual conference runs from May 8 through June 6, 2020.

The conference website was created by ePosterBoards, LLC.

CELEBRATION OF

SCHOLARSHIP & CREATIVITY

Welcome to the 13th annual Worcester State University Celebration of Scholarship and Creativity. This is one of the highlights of the academic year at Worcester State University as we showcase the wonderful creative and scholarly work of our students.

We are enormously proud of the opportunities our undergraduate and graduate students have to embrace active learning locally, nationally, and internationally in concert with outstanding faculty mentors who are exceptional leaders in their fields. We are, further, elated that, despite the COVID-19 crisis, Worcester State University has been able to hold the Celebration in an exciting virtual format. Each project is available on the conference website. The site features impressive research and creative projects across the range of disciplines of study at Worcester State, from the natural sciences and social sciences to the arts and humanities.

Please immerse yourself today in this culture of active learning and savor the abstracts here as a window into what happens every day at Worcester State University.

Lois A. Wims, Ph.D.
Provost and Vice President for Academic Affairs

BIOLOGY

At4g19430: A Floral Specific Gene of Unknown Function

Bernice Mensah

Faculty Advisor: Aleel Grennan, Ph.D.

Funding Source: Aisiku Undergraduate Research Summer 2019 Fellowship

The function of the Arabidopsis thaliana floral specific gene, At4g19430, is unknown. The research project's goal was to identify the expression patterns of At4g19430 in A. thaliana plants where the protein is tagged with green fluorescent protein and to compare gene sequences between related species. Stereomicroscope Fluorescence Adapter (SFA) was used to observe GFP expression in mutant lines and PCR was used to identify gDNA sequences.

A Study of Pine Soil Biota

Liliannette Ojen, Rafaela Lopes

Faculty Advisor: Aleel Grennan, Ph.D.

Sandy clay loam soil is commonly associated with Worcester County. Our soil sample was collected from a mixed pine forest during mid-winter at a temperature of 4 degrees Celsius. It has an acidic pH of 4.72. We will test the hypothesis that the ions in the soil are most likely immobilized and will favor acidophilic organisms.

The Effects of Sandy Soil on Its Mesofauna and Microfauna

Brianna Marchetti, Andy Hernandez

Faculty Advisor: Aleel Grennan, Ph.D.

Soil composition is an important factor for organisms that live in or around the soil. This project focused on the percentage of sand in soil and how it affected the mesofauna and microfauna in the soil. We collected samples of soil with high to low percentages of sand and then observed organisms in the soil under microscopes. The higher sand content may result in lower diversity and population of organisms.

Restoring and Expanding the Flora of the Florida Keys

Malcolm Duport, Anita Faath, James Fadden, Emily Hamparian, Riley Harrington, Matthew Kerr, Sydney Leitao-Pina, Devan Mobley, Therence Ntihinduka, Owen O'Brien, Ashley Ouellette, Amiya Phillips, Benjamin Posnik, Adrian Robledo, Gabriela Santana, Joseph Santaniello, Ariana Solomon, Elise Stone, Erika Syokau

Faculty Advisors: Mark Wagner, Ph.D., Steven Oliver, Ph.D., Ellen Fynan, Ph.D., Aleel Grennan, Ph.D.

In the spring of 2019, Professors Wagner and Oliver went to Mote Marine lab as a preliminary visit to determine the suitability of the facility in Summerland Key, Florida, for a field biology course over spring break 2020. In addition to the work at Summerland Key on coral reef rehabilitation and coral pathogens, we established a plan to work at Grimal Grove in a terrestrial habitat survey and rehabilitation project. The students in this course spent the Spring 2020 semester preparing for the trip, which was unfortunately canceled as a consequence of COVID-19. Rather than leave the work unrecognized, Professor Wagner and several students put together a video which summarizes the work that has been done to date and lays out the plan for future trips once travel to Florida is again possible.

Analysis of Soil Microfauna and Composition

Victoria Babcock, Lyndsey Hebert, Kassandra Nazzaro

Faculty Advisor: Aleel Grennan, Ph.D.

Soil quality has a major impact on ecological and agricultural processes. Through an analysis of the pH, ionic content, and the microfauna in soil, the relative health of the soil was determined. Several probes were used for testing the chemical composition of the soil from Thompson, Connecticut, and a Berlese funnel was utilized for the microfauna. The soil analysis yielded results that fell within the expected parameters for sandy clay loam.

Validating an Efficient Transformation Method to Identify Gene Function in Green Foxtail

Hoang Vo

Faculty Advisor: Aleel Grennan, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant, and the Beta Beta Beta Biological Honor Society National Research Grant

A Commonwealth Honors Project

Understanding gene function will provide us with key data needed to understand how organisms thrive in their environment. Gene function can be studied using transformation, a multi-step process to introduce foreign genes into the host's genome. This project investigated a reliable method to transform the C4 plant Setaria viridis. Two transformation techniques, electroporation and polyethylene glycol, were compared for ease of use and transformation efficiency.

Functional Characterization of Ifih1 and Dhx29 during Early Xenopus Development

Elizabeth Devaney

Faculty Advisor: Daron Barnard, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

A Commonwealth Honors Project

Xenopus laevis are studied to understand processes in oocyte development. Maturation is temporarily suppressed, later continuing upon a hormonal signal. Meiosis resumption requires protein synthesis directed by stored mRNAs. Concurrently, Ifih1 mRNA is present, suggesting a regulatory role. Cloning of Ifih1 cDNA will allow rescue and overexpression, enabling identification of potential binding partners, and helping to further characterize the Ifih1 protein.

The Differences in Soil Properties and Biota of Gardening Soil vs. Soil Found in a Mostly Natural Environment

Madisyn Constantine, Julia Fitzpatrick, Nicholas Kelley

Faculty Advisor: Aleel Grennan, Ph.D.

The project's goal is to determine differences in soil properties and biota of gardening soil vs. soil found in a mostly natural environment. Two soil samples from Worcester County were analyzed, one from a garden and the other from a woods/backyard area. The comparison helps determine properties of fertile soil.

Vernal Pool Soil and Risk of Chytrid Fungus

Brittany Julien, Donald Mahan

Faculty Advisor: Aleel Grennan, Ph.D.

Soil from a vernal pond in Worcester County was collected in late winter. It had a high water content and the soil texture was a gritty, sandy, clay loam. Having a high water content would lead us to believe we would have a high diversity of biota in the soil sample.

Expressing Phosphorylation Site Mutants of Twist Transcription Factor in MDCK Cells

Uyen Nguyen, Brenda Thomas

Faculty Advisor: Jennifer Hood-DeGrenier, Ph.D.

Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

Twist is a transcription factor that triggers the epithelial-mesenchymal transition (EMT) required for metastasis of cancer cells. Studies have shown that Twist is phosphorylated on two sites, but the function is not known. We are in the process of generating cell lines that stably express Twist with mutations in these phosphorylation sites in order to characterize the gene expression and morphological phenotypes associated with altered Twist phosphorylation.

The Impact of Poor Water-Retentive Soil on Microbiota Presence

Sherree Coleman, Lucas Horan, Joseph Pryor

Faculty Advisor: Aleel Grennan, Ph.D.

Soil is a reliable shelter for many kinds of microbiota and plays a significant role as a water and food source. Soil with higher sand content is known to have poor water retention in comparison to other soil textures. We aim to find the impact of low soil moisture, as found in predominantly sandy soil, on the presence of microbiota living in them.

Maintenance of Vero Cells in a Teaching Lab

Christen DiCarlo

Faculty Advisor: Yan Hu, Ph.D.

Vero cells are derived from the kidney of an African green monkey, 3T3 cells are initiated from Swiss albino mouse embryo tissue, and Sf9 cells originally established from insect ovarian tissue. All these cell lines are commonly used in microbiology and cell biology research. We provide an update about how we grow and maintain these cell lines and how we study the chemical compound toxicities with these cell lines in a teaching laboratory setting.

BIOTECHNOLOGY

A Study in the Floral Ultrastructure

Tanvi Pathrikar

Faculty Advisors: Aleel Grennan, Ph.D., Peter Bradley, Ph.D.

The stigma is the receptive surface of a flower where the pollen grains land. Pollen grains are structures that carry the male reproductive cells of plants. The pollen grains have varied sizes and shapes, and a distinctive outer coat, depending on the species of the plant. This study focuses on the differences in stigma surfaces and pollen grains among different plant species.

Use of PCR (Polymerase Chain Reaction) with Fecal DNA to Locate Remnant Populations of New England Cottontails

Kaitlin Young

Faculty Advisor: Randall Tracy, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

A Commonwealth Honors Project

The native New England cottontail populations have been overrun by the invasive Eastern cottontail. This project's focus was to validate and master an existing technique using PCR to distinguish the two species from their fecal DNA. Not only did this study test this method for species identification, but a standard operating procedure was also created for future work to locate remnant populations of the rare New England cottontail.

Isolation and Characterization of Nematocidal Bacillus thuringiensis Strain from the Soil

Hadeel Hamza, Sydney Wilson

Faculty Advisor: Yan Hu, Ph.D.

This project explores the anthelmintic properties of crystal proteins produced by Bacillus thuringiensis. We have developed an efficient pipeline to screen potential nematocidal Bt strains from collected soil samples. Soil-transmitted helminths are nematodes that infect more than 1.5 billion of the poorest people and are leading causes of morbidity worldwide. New anthelmintics are urgently needed to produce higher cure rates and overcome emerging resistance.

A Study of Plant Protoplasts of Parsnip (Pastinaca sativa) and Carrot (Daucus carota) Using Microscope Techniques*

Oscar Velazquez Cuazitl

Faculty Advisor: Peter Bradley, Ph.D.

Plant cell walls are composed of polysaccharides like cellulose and pectin that protect the living part of the cell, the protoplast. An enzyme mixture of cellulase and pectinase can be used to digest these structures and isolate protoplasts to be used for cell fusion or material introduction. Here, parsnip root (Pastinaca sativa) protoplasts were isolated, studied with light and scanning electron microscopes, and compared with carrot root protoplast structures.

BUSINESS ADMINISTRATION

Data Analytics in Accounting

Lindsey Hoggins

Faculty Advisor: Mary Clay, D.B.A.

A Commonwealth Honors Project

I am going to complete a narrative review on how data analytics are used in the accounting world. I will research any changes in the accounting profession due to the growing ability to analyze Big Data. I will also determine what type of skills will be required by future accountants to analyze this data and how data analytics should be incorporated in academia.

CHEMISTRY

The Synthesis Study of Thielavin T

Han Nguyen, Camryn Cherella

Faculty Advisor: Weichu Xu, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

The emergence of antibiotic-resistant bacteria has become a major concern in public health today. It is urgent to develop new antibiotics to tackle the issue. This research focuses on the synthesis of thielavin T, a natural product that shows potential antibacterial activities against Gram-negative and Gram-positive organisms. The activities of thielavin T and its derivatives will be studied to search for more drug-like antibacterial compounds.

COMMUNICATION, LIBERAL STUDIES

What Do You See?

Tracy McKenzie

Faculty Advisor: Donald Bullens

A Commonwealth Honors Project

A photograph tells a story. It can either reflect reality or create an illusion. Every photographer has a different style, a different vision within the images they produce. A great photograph can propose a unique power of leaving an impression in the minds of the viewer. The viewer can perceive the photograph and recreate it within their own mind. Come see this exhibit and tell what you see.

COMMUNICATION SCIENCES & DISORDERS

The Relationship between Language Performance and Executive Function Assessments in Adults Aged 20-85*

Kali Trepanier, Jacob Lawrence

Faculty Advisor: Colleen Karow, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

Executive functions (EF) are theorized as a broad area of cognition that mediates all cognitive processes and behavior. While there are many tests available to assess EF, the specific processes measured are not well defined and more information on validity is needed. This research examined the role of language in EF assessment and compared performance across four EF tests controlling for language load and cognitive processes in 70 adults grouped by age.

Hearing Health Care

Sarah Farnham, Aviya Singer, Marissa Merrifield

Faculty Advisor: Keith Darrow, Ph.D.

A Commonwealth Honors Project

Much of the population suffers from a progressive degenerative disease: hearing loss. Risk factors for hearing loss are age, noise exposure, and chemotherapy. Comorbidities of hearing loss are falls, depression, dementia, and premature death. Risk factors and consequences of hearing loss can be prevented. This research works to educate, advocate, and improve accessibility for the medical treatment of hearing loss.

COMMUNICATION SCIENCES & DISORDERS, LIBERAL STUDIES

A Single Case Investigation of the Intelligibility of a Child with Childhood Apraxia of Speech

Amanda Whalen

Faculty Advisor: Kristina Curro, Ph.D.

A Commonwealth Honors Project

Childhood Apraxia of Speech (CAS) is a pediatric neurological speech-sound disorder, resulting from difficulties with oro-motor planning and execution. Children with communication difficulties may become frustrated because they cannot communicate effectively, resulting in aggressive behaviors. The first part of this single-case study examines the intelligibility (as measured by percent consonants correct) in a therapeutic setting.

COMPUTER SCIENCE, COMMUNICATION SCIENCES & DISORDERS

Digital Signal Processing and Audio Feature Extraction

James Young

Faculty Advisor: Karl Wurst, Ph.D., Roger Towne, Ph.D.

With a large number of possible applications, digital signal processing and machine learning are a powerful combination to solve a myriad of problems in the future. Furthermore, this technology could help to create products that could assist in speech therapy or linguistic research. This project explores digital signal processing and attempts to find patterns between extracted audio features and human speech.

COMPUTER SCIENCE

Cars: How Safe Are They?

Afua Agyare

Faculty Advisor: Elena Braynova, Ph.D.

This project uses a dataset about cars to predict car safety based on the remaining car features. The dataset was studied using visualization and some statistical analysis. We classified car safety using a variety of classification models such as Decision Tree, Lazy, Rules, and Bayes Model. We used different algorithms and testing options. Classifiers were evaluated and compared in terms of their efficiency and accuracy.

LibreFoodPantry: Diving into DevOps by Developing Open Source Project Infrastructure

Christopher Radkowski

Faculty Advisor: Karl Wurst, Ph.D.

Funding Source: Aisiku Undergraduate Summer Research Fellowship

My project was focused on improving the infrastructure for the LibreFoodPantry (LFP) project, testing a proposed workflow, and creating documentation for it. My research goal was to find the best tool to develop the LFP projects with. I also tested a proposed workflow with different tools to see how well it worked. Ultimately, a decision was made to use GitLab Gold as the tool to develop the LFP projects with and documentation was created for the workflow.

Worcester Crimes Data: Analysis and Predictions

Thomas Rokicki, Oresti Duro

Faculty Advisor: Elena Braynova, Ph.D.

The intent of this project is to understand a Worcester crime dataset. One of the questions asked is: What are the most dangerous neighborhoods in Worcester? The project involves visualization and statistical analysis of the dataset. It also attempts to predict where a crime may occur in the future. It uses a variety of data mining algorithms to construct an effective prediction model. This can help better understand how to make Worcester safer.

Classification of Rock Images Using a Convolutional Neural Network

Kelsey Rustin

Faculty Advisor: Elena Braynova, Ph.D.

This project involved building a convolutional neural network designed to classify images of two different types of rocks. The dataset was constructed by scraping more than 1,000 images from Google. Three image classification models were built. The first and second models were trained using resized 20x20 pixel images and resized 100x100 pixel images, respectively. The third model was trained using 100x100 pixel images and was implemented using transfer learning.

Mushrooms: Tasty Treats or Forbidden Snacks?

C.J. Steinbrecher

Faculty Advisor: Elena Braynova, Ph.D.

This project aims to show how data visualization and statistical analysis of a dataset might help with attribute selection and improve the efficiency of a prediction model. We used data collected for more than 8,000 mushrooms and predicted if they were edible or poisonous. The dataset has 24 attributes. We are analyzing the attributes' importance and their relationships using a variety of visualization and correlation methods.

Health of Big Cities

Yesenia Mercedes-Nunez

Faculty Advisor: Elena Braynova, Ph.D.

This project studies health of big cities. The dataset used has health indicators that represent rate of diseases such as HIV/AIDS, cancer, nutrition/physical activity/obesity, food safety, infectious disease, and more. It used visualization and statistical analysis to answer questions such as, "What is the greatest health concern for big cities?" and "Which health concern will we see an increase in?" We have constructed prediction models and discussed their efficiency.

Data Analysis of Computer Science Majors at Worcester State University

Derin Sabu, Haoru Song

Faculty Advisor: Nada Alsallami, Ph.D.

This project is based on a student dataset provided by the Worcester State Office of Institutional Assessment and Planning. The aim of this project is to analyze some features of the computer science majors at WSU by designing a relational database and an embedded JAVA program to access data. Our goal is to find out and compile the students' information focusing on gender, ethnicity, full- or part-time status, and commuter or resident status.

EARTH, ENVIRONMENT, & PHYSICS

Planting Good Seeds: A Comparative Study of Successful Food Justice Projects Between De-Industrialized Regions in Massachusetts and California

Rhiannon Dugan, Rebecca Lulu, Ed Reitz III

Faculty Advisor: Alexander Tarr, Ph.D.

Our study compares and analyzes successful food justice organizations in Worcester County, Massachusetts, and Alameda County, California. Comparison of these regions reveals common trends in how organizations are successful despite local constraints. Even though it faces shortages in funding and space, California has continued to expand food justice projects in ways that would be advantageous in Worcester.

Broad Meadow Brook Land Use History

Kaylee Klenk

Faculty Advisor: William Hansen, Ph.D.

For this project, Mass Audubon's land use history will be examined and compared over time. With GIS mapping, LiDar and aerial photography will be compiled and contrasted through the 1938-2020 period. Forest and eco community types will be identified with data gathered from field work. These data will be compiled to create a GIS database of Mass Audubon's Broad Meadow Brook sanctuary and can be used for land management and serve as a baseline for field work.

How Beavers Affect and Cause an Effect

Tony Pen, Lucas Ferreira

Faculty Advisor: William Hansen, Ph.D.

Beavers are one of the few animals on Earth that can alter the landscape. Massachusetts banned the use of steel-jawed leg hold traps on land in 1975, and banned the use of both steel-jawed and padded leg hold traps entirely in 1997. Mass DFW estimates the beaver population has since increased from 20,000 to 70,000. This project uses remote sensing to analyze the increase of surface hydrology (wetlands) in Massachusetts in relation to the increase of beavers.

Joint Base Cape Cod Water Contamination Effects

Joseph Capps, Conor McDonnell

Faculty Advisor: William Hansen, Ph.D.

Military bases have a major effect on the environment. Joint Base Cape Cod (JBCC) is responsible for several contamination events due to the firefighters of JBCC spraying firefighting foam. The foam contains chemicals such as PHOA and PHOS. The firefighting foam was tracked throughout groundwater in Falmouth and Mashpee. Using MassGIS data, we mapped potentially contaminated groundwater. We found that the local groundwater was contaminated.

How Remote Sensing Data from the Mars Reconnaissance Orbiter Helped Choose the Landing Site for the Mars 2020 Rover

Melanie Meadors

Faculty Advisor: William Hansen, Ph.D.

A vital part of NASA's Mars 2020 mission was to find a landing spot with few travel hazards and a wealth of scientific data. This project used imagery captured by instruments on the Mars Reconnaissance Orbiter and methods of remote sensing to extrapolate why Jezero Crater was selected as the site versus other possibilities. This site was found to hold scientific interest as well as terrain that would be safe for the rover to operate in, ensuring mission success.

Impacts of Wildfires on Northern California's Vegetation Dynamic

Colleen Cutting, Alana Landry

Faculty Advisor: William Hansen, Ph.D.

Much of northern California forest cover is made up of mixed-conifer vegetation. Over the past few decades, increased drought has caused the frequency of wildfires to increase and change the vegetation cover. By using Landsat imagery and NDVI, it is possible to quantify the amount of vegetation change and the impacts it may have in the local environment.

The North Atlantic Cold Blob Anomaly

Cori Scott, John Morissette

Faculty Advisor: William Hansen, Ph.D.

Climate change has affected Earth systems in myriad ways. Satellite images have picked up a "cold blob" in the North Atlantic in recent decades. Remote sensing technology can help to track the evolution of this anomaly and the potential long-term effects of its existence. This study will use AIRS imagery to examine the changes in SST and their effects on the AMOC.

Deforestation in Jamaica Time Lapse Study of Vegetation Cover Change

Jermaine Ricketts, Amaya Lloyd

Faculty Advisor: William Hansen, Ph.D.

Deforestation is a rising issue for many countries in the world. We will look at the increased deforestation that has taken place in the northwest regions of Jamaica since the 1980s due to tourist activity. We will use Landsat 4 and 8 satellite images ranging from 1980 to present day to determine how the area has developed. Tourism development has replaced areas that were previously filled with vegetation, causing environmental destruction to this coastline.

Climate Risk Assessment for Wentworth Institute

Debra Shepard, Lynne Stone

Faculty Advisor: William Hansen, Ph.D.

In the upcoming years, impacts from climate change will threaten the Boston area. The Back Bay is a low-lying, densely populated area that includes colleges such as Wentworth Institute. Through geospatial tools, resiliency plans can be created to help prepare for hazards, such as stormwater flooding and extreme heat.

Understanding the Energy Balance of Planet Earth

Nathaniel DeVries

Faculty Advisor: Nabim Malakar, Ph.D.

The main sources of energy that drive the planet's ecosystem come from the sun in the form of shortwave radiation. We will demonstrate how the physical basis of thermal infrared radiation can help us understand the energy budget of our home planet. Max Planck's laws of black body radiation provide the necessary tools for this analysis. We will also explore how understanding the energy budget of our home planet can help us guide our energy policy for the 21st century.

Analysis of Narragansett Beach Erosion with a Special Interest in Hurricane Sandy

Isabella Johnson, John Arsenault

Faculty Advisor: William Hansen, Ph.D.

Rhode Island is the second most densely populated state, and its 420 miles of coastline are crowded with homes and businesses. The increasing rate of erosion and sea level rise, and the effects of coastal storms and flooding, are making the state's coastal landscape ever smaller. We will be comparing elevation data sets from 2000, 2007, 2010, and 2013/2014 in order to create multiple DEMs that indicate the level of erosion over the past 15 or so years.

Quantifying the Impact of Urban Land Uses on Streamwater Quality

Paige Robidoux, Jacquelyn Burmeister

Faculty Advisor: Allison Dunn, Ph.D.

We investigated how road salt treatments in urban areas affect streamwater salinity. Measurements of specific conductance, temperature, and salinity were taken from Tatnuck Brook using a YSI Pro30 conductivity meter. Since October 2019 the upstream site had an average specific conductance of 126.2 uS/cm and the downstream site had an average of 384.1 uS/cm. Our results suggest road salt treatments have a significant effect on downstream water salinity.

Analysis of the Impact of Drought on Vegetation in Northern California

Julia Fitzpatrick

Faculty Advisor: William Hansen, Ph.D.

Prolonged droughts can have severe consequences for the flora and fauna comprising an ecosystem. The state of California experienced a long-term drought from around 2011 to 2017. Utilizing Landsat8 satellite imagery, the impact of the drought on the health of the vegetation in northern California can be determined through vegetation indices.

Carbon Sequestration in Two New England Forest Stands

Walter Talbot

Faculty Advisor: Allison Dunn, Ph.D.

A study was conducted to determine how environmental factors influence tree growth and their carbon sequestration. Annual tree growth in a Massachusetts forest was evaluated over a 10-year period for its response to temperature, precipitation, and sunlight. The study determined that temperature and sunlight may linearly affect tree growth, with tree growth decreasing with increased temperatures. The relationship of precipitation on tree growth was inconclusive.

Assessing Solar Energy Potential for Worcester, Massachusetts

John Veneziano

Faculty Advisor: William Hansen, Ph.D.

As fossil fuels continue to decline in viability, alternative energy sources will become vital in satisfying energy demands. This study identified areas of Worcester that have high solar energy potential, and looked at land use to further examine ideal solar harvesting locations. To do this, a raster analysis was conducted using solar data recovered from Mass GIS. By using features such as slope and aspect in Arc Map 10.7.1, viable areas could be located.

Sea Level Rise Vulnerability of Cape Cod

Annelise Batista, Edward Reitz

Faculty Advisor: William Hansen, Ph.D.

Cape Cod has both historical and cultural importance, fueling a successful tourism and residential economy. This project examines future flood potential from 2040 to 2100 on Cape Cod given current global emission trends. We also will show how sea level rise will affect different property values for different towns on Cape Cod using the USGS DEM topobathymetric model, the IPCC RCP8.5 scenario, and the MassGis Land Parcel data.

Mapping the Bathymetry of Webster Lake to Combat Invasive Species

Austin Lemire

Faculty Advisor: William Hansen, Ph.D.

Lakes in Massachusetts are under threat from invasive species. Invasive species are problematic because they displace local species and do not have natural predators that can control their populations. This research is to identify areas of Webster Lake that are potential habitats of invasive species. Geospatial tools and LIDAR data from NOAA will be used to express digital elevations and examine potential areas of Webster Lake with invasive species.

Tracking Yellowstone's Geothermal Energy

Enida Sulaj, Erin Sacharanski

Faculty Advisor: William Hansen, Ph.D.

Yellowstone National Park sits on top of an ancient, active volcano that fuels geysers such as Old Faithful. This has the potential to provide geothermal energy that energy companies near the park can harness. Careful monitoring is essential to prevent these activities from negatively impacting Old Faithful geyser by extracting too much of the subsurface water. Landsat imagery can be used to monitor heat emissions before and after these activities.

Vegetation and Landscape Assessment of Wildfires on Australia's Kangaroo Island

Lauryn Mulcahy, Anthony Shepard

Faculty Advisor: William Hansen, Ph.D.

Australia is home to the most biodiverse ecosystems, but also the most violent natural disasters. Wildfires have grave impacts on entire landscapes that can last for decades. In recent months, a large wildfire engulfed Australia, including Kangaroo Island, which resulted in drastic changes to the vegetation structure on the continent. The spread of wildfires on this remote island shows how wildfires have severe impacts on isolated areas with specialized ecosystems.

HEALTH SCIENCES

Assessing Nutritional Knowledge and Dietary Habits of Worcester State University Athletes

Matthew Cummings, Anne Nyland

Faculty Advisor: Mariana Calle, Ph.D.

Nutrition plays a central role in a collegiate athlete's performance. There is not enough data about the diets of Division III college athletes. This cross-sectional study evaluates the dietary knowledge and habits of WSU athletes. An anonymous online survey will be administered targeting athletes. The findings of this study will provide support for the creation of adequate nutritional interventions to improve WSU students' athletic performance and overall health.

Food Environment: An Analysis of the Nutritional Value in Snack Food Available on the Worcester State University Campus

Megan Mattox

Faculty Advisor: Mariana Calle, Ph.D.

Obesity is a prevalent public health concern, with 36 percent of young adults being affected according to the CDC. Numerous studies tie high-calorie snacking to increased risk of obesity. Vending machines on college campuses offer snack foods and beverages with varying nutritional contents. This cross-sectional study analyzes key nutrients of vending machine contents on campus to gain insight into the healthfulness of the snack options made available to WSU students.

Social Capital: A Network of Relationships

Kaila Bavin, Katelyn Stevens

Faculty Advisor: Laura Bothwell, Ph.D.

A Commonwealth Honors Project

Social capital relates to our ability to work cohesively and form strong relationships that create productive outcomes. Social capital includes economic resources that one gains from being part of a network of social relationships. Unfortunately, economic inequality causes an absence of social capital in some societies, leading to an imbalance of opportunities. This research explores in depth the differences in access to social capital in different societies.

HISTORY & POLITICAL SCIENCE

The Complexity of Borders in Medieval Britain

Ashley Timmons

Faculty Advisor: Martin Fromm, Ph.D.

Borders in medieval Britain were a complex matter, not simply dealing with physical boundaries, but cultural and linguistic as well. The constant warfare spanning from late antiquity through the Late Medieval Period played a significant role in the intangibility of the border of medieval Britain, through language and culture alike.

Moral and Ethical Frameworks on Data Mining

Jaymi-Lyn Souza

Faculty Advisor: Nathan Angelo, Ph.D.

Emerging technologies have always had a great deal of influence on people's lives and, more largely, on society as a whole. Technology created in the era of the Information/Communication Technological Revolution is no different: digital technology has and will continue to present new moral and ethical dilemmas. This project applies several different ethical and moral philosophical frameworks to examine the social and political implications of data mining.

Housing First for the Homeless

Michael Kubicki

Faculty Advisor: Anthony Dell'Aera, Ph.D.

Clearly homelessness is a problem in our society, disproportionately affecting different groups. This study focuses on homeless veterans and the use of a Housing First model to solve many of the underlying issues that cause homelessness. The Housing First model has been around for decades but has gained traction in recent years. This study will show that the benefits of Housing First outweigh the negatives and that the approach is superior to other approaches.

INTENSIVE ENGLISH LANGUAGE INSTITUTE

Immigrants Like Us

Claudia Oliveira De Paiva, Jaine Mackievicz, Alda Ushe, Rhona Gonzalez, Chai-Ling Tsai, Cynthia Asencios

Faculty Advisor: Virginia Drislane, Ph.D.

Funding Source: WSU Intensive English Language Institute

This project explores the stories of immigrants who came to the United States in search of not only economic, but also social opportunities. The project represents the culmination of two semesters of work collecting, transcribing, and analyzing oral histories of ethnic restaurant owners in Worcester. Through this project, the voices of these members of the Worcester community can be shared and heard.

LIBERAL STUDIES

Education across the Globe

Bianca Rheaume

Faculty Advisor: Henry Theriault, Ph.D.

Through the Liberal Studies program my two minors combine to create a major for me that will allow me to teach in places other than the United States, such as on military bases or in other countries, which is what inspired this project. For my project I plan to look into education across the globe and compare education systems based on the successes of their students. I will also focus on which countries implement standardized testing and compare their success.

The Changing "Field" of Watersports

Ethan Melia

Faculty Advisor: Henry Theriault, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

This project adjusts an old-time, traditional boat shop into a millennial-attracting sporting needs store, in an eye-catching new facility. Lakeview Marine, Inc. has been a long-lasting, family-driven, well-supported local marina, with decades of successful customer service and a sense of community. Paul's Marina, Inc., would be a revised version incorporating what has worked together with new elements replacing elements no longer attractive to millennials.

The Impact of Livestock Agriculture on Climate Change

Ibraheem Sandakli

Faculty Advisor: Henry Theriault, Ph.D.

This research analysis will examine research on the impact of livestock agriculture on climate change. For a long time, the topic of meat production has not been in conversations about climate change. Issues like deforestation and the burning of fossil fuels were given the most importance. However, more recently, the topic of livestock agriculture has been brought into discussions about climate change.

A Look into Federal Laws Through a Cost/Benefit Analysis

Emma Boisvert

Faculty Advisor: Henry Theriault, Ph.D.

Federal laws are seemingly intended to keep Americans safe, in line, and not deviant. This project tests certain laws by applying a utilitarian cost/benefit analysis to determine whether the laws tested are really as beneficial as they appear intended to be. The project will then consider whether the results suggest that the laws that fail the cost/benefit testing were in fact not intended to benefit some segment of the population covered by them.

Transitioning Into the "Real World"

Madison Troy

Faculty Advisor: Henry Theriault, Ph.D.

Why are some college students not prepared for the transition into the "real world"? Does the problem originate from high school curricula? This project will delve into pertinent topics that are brushed over in common secondary and higher education systems. Universities should have programs that educate their students in preparation for "real-world" responsibilities.

Get to Work

Patricia Hallet

Faculty Advisor: Henry Theriault, Ph.D.

This project will show the benefits of combining traditional surveys of skills and interests with non-traditional assessments of the capabilities of life skills students at technical high schools. The main objective is to efficiently train the students for employment after high school based on the combinations of tests and observations. This process may benefit each student, accenting individual capabilities ultimately towards employment success.

The Bellringer Effect

Nanette Moulin

Faculty Advisor: Henry Theriault, Ph.D.

Students often say, "I won't remember this once I'm done with the test." Memorizing material for a test seems to be a popular method of learning, but not an effective one. In a ninth-grade algebra class, bellringers that focus on content students have learned throughout the entire year at the start of each class will be used to help students learn material. To measure the success of this method, students will be tested before and after the bellringer approach is used and their scores compared.

What Makes People Tick?

Shannon Buckley

Faculty Advisor: Henry Theriault, Ph.D.

This project will examine the increased rate of mental illness in the United States. It will consider how mental illnesses are currently diagnosed, who is primarily affected, and why they are affected.

The United States Mass Incarceration System and its Correlation to Slavery

Michaela Mooney

Faculty Advisor: Henry Theriault, Ph.D.

This presentation focuses on the American prison industrial complex. Once slavery was legally abolished, it was not just abandoned. The policies, labor, and group targeting of slavery helped form the further development of the American legal system. This presentation will focus on the evolution of laws, the emergence of privatized prisons, and the circumstances within the court systems that have turned the American legal system into a form of modern slavery.

How Powerful Institutions Have Used NDAs to Cover Up Sexual Harassment

Stephen Lenane

Faculty Advisor: Henry Theriault, Ph.D.

Sexual harassment has long been a problem in society. Whether it is in the private sector, religious organizations, or our government, powerful institutions have perpetuated a culture that tolerates sexual harassment. In these same institutions, it is common to use non-disclosure agreements (NDAs) to silence survivors, further perpetuating that culture. In my presentation, I will be looking at the use of NDAs by powerful institutions and the laws surrounding them.

The Use of Visuals in ELL Classes

Arjana Guri

Faculty Advisor: Henry Theriault, Ph.D.

The purpose of this research project is to determine the effect of the use of visuals as an instructional tool on students' engagement and learning in education. Data will be gathered from published studies and analyzed to better understand how visuals affect students in education.

Motivation in the Classroom

Abigail MacGregor

Faculty Advisor: Henry Theriault, Ph.D.

Motivation in the classroom is something many students struggle to find. This presentation will analyze the psychology behind motivation and why students may not be able to find a purpose for education. Teachers play a big role in the motivation of their students, so their techniques and the classroom environment will also be discussed.

Discrepancies in American Health Care

Murray Rubin

Faculty Advisor: Henry Theriault, Ph.D.

The United States is the wealthiest of all developed nations. Despite this fact, we pay a premium price for the same prescription drugs compared to other countries. Through the lenses of economics and biology, this project analyzes this issue and presents an understanding why this is a form of price gouging. This project will work by isolating issues of concern in pharmaceutical and insurance companies and exposing shady business practices behind these companies built to "protect" us.

MATHEMATICS

Exploring Real and Complex Exponential and Logarithmic Functions

Rachael Thibeault, Brandon Plouffe, Anastasia Nedoroscik

Faculty Advisor: Maria Fung, Ph.D.

This project will develop an understanding of logarithms and exponentials in the real and complex number domains. It will expand the knowledge of these functions through the comparison and contrasting of the real and complex cases.

Measuring the Efficiency of Matrix Multiplication

Eric Nguyen

Faculty Advisor: Noah Daleo, Ph.D.

Matrices are a type of data structure that regularly appears across multiple disciplines. Multiplying matrices is a common task that is done when working with matrices. In this project, various matrix multiplication algorithms (such as methods by Strassen and by Laderman) will be performed to show that the standard way of multiplying matrices is no longer the most efficient.

An Analysis of Chemical Usage in Ecosystems Following Kolmogorov Predator-Prey Models

Neil Rao

Faculty Advisor: Timothy Antonelli, Ph.D.

This project investigates the changes in chemical usage in an ecosystem that follows the Kolmogorov Predator-Prey equations.

The Development of the Complex Plane

Brian Yentz, Alexandre De Almeida

Faculty Advisor: Maria Fung, Ph.D.

This project will begin with Argand's development of the complex plane via ratios. Then, it will show how both real and complex numbers can be represented as vectors. It will conclude with methods of performing simple arithmetic on complex numbers such as addition and multiplication, and their inverses.

Algebraic Properties of Western Music

Nathaniel DeVries

Faculty Advisor: Maria Fung, Ph.D.

A Commonwealth Honors Project

One often hears the claim that there are many connections between music and mathematics; however, this idea is rarely probed beyond the surface. This project describes a very specific connection between music and mathematics by exploring triads and sevenths and by determining how they relate to the algebraic structure of regular polygons.

Cryptology and the Classroom

Jason Truax

Faculty Advisor: Maria Fung, Ph.D.

This project will connect the concept of cryptology to secondary mathematics classrooms. This means considering the mathematical understanding behind cryptology and breaking it down into sections that can be brought into the mathematics standards and curriculum within high schools. The purpose of this is to create a more engaging classroom, because there is a direct correlation between the real-life application of cryptology and what is being taught every day.

History of Quadratic Equations

Alexa Bobbin, Shaylee Puleo

Faculty Advisor: Maria Fung, Ph.D.

This project examines the history of quadratic equations. Specifically, it discusses famous mathematicians, such as al-Khwārizmī, who developed a procedure we now know as "completing the square." From this process, he derived the quadratic equation formula, which we see in many high school mathematics classrooms today.

Gaussian Integers

Alexandera Wilson, Kylie Gilroy

Faculty Advisor: Maria Fung, Ph.D.

This project will be an introduction to the Gaussian integers and focus on their algebraic properties. The project will focus on unique factorization properties of the ring of integers and connect this idea to the complex plane.

Kakuro in the Classroom

Kylie Gilroy

Faculty Advisor: Maria Fung, Ph.D.

Kakuro puzzles bring logic and mathematics together in a fun and easy format, where the solver will be sharpening their mathematics skills as well as their logic skills in the process. At higher education levels, students could develop their inductive and deductive reasoning skills by means of creating and utilizing various solving strategies in order to complete a full puzzle.

Continued Fractions

Megan Bellve

Faculty Advisor: Maria Fung, Ph.D.

This research project gives an analysis of finite and infinite continued fractions. This project aims to find any patterns that irrational numbers might have. Two types of numbers were used for irrational numbers: algebraic numbers and transcendental numbers. The analysis shows that the algebraic numbers have a repeating pattern. Meanwhile, the transcendental numbers do not have any pattern at all.

Figurate Numbers and Sums of Powers of Consecutive Natural Numbers

Emma Poplawski

Faculty Advisor: Maria Fung, Ph.D.

This project considers both a geometric and an algebraic approach to finding the sum of the first n natural numbers. It also provides some applications, and in particular discusses variations of the handshake problem.

Pianos and Math

Harmony Estabrook

Faculty Advisor: Maria Fung, Ph.D.

Music is an incredible part of the human experience and represents some of our best qualities: creativity, passion, emotion, and so much more. However, music also has an incredibly analytic base. There are logical patterns and clear mathematical connections to be found in every part of music theory. We will explore mathematical representations of the vibrating systems that produce musical pitches in pianos to demonstrate some of those patterns and connections.

MATHEMATICS, URBAN STUDIES

A Preliminary Analysis of Affordable Housing in Worcester County

Joshua Oliver

Faculty Advisors: Mary Fowler, Ph.D., Elizabeth Gilbert, Ph.D., Thomas Conroy, Ph.D.

Funding Source: Aisiku STEM Center Summer Fellowship Grant

By analyzing data from the American Community Survey on the city of Worcester and Worcester County outside the city, it is clear that there is a major difference between the two different groups of inhabitants with respect to numerous variables. Thus, it is important to create a model that will identify the variables that have the most significant effect on affordable housing, specifically on the percent rent burdened.

NURSING

Military Veterans and the Transition to Nursing School: A Literature Review

Stephen Healy

Faculty Advisor: Danielle Shaver

The aim of this project is to show the possibilities and advantages that bringing military veterans into the nursing field can bring. This project demonstrates the roadblocks and challenges that these veterans face in the transition from a military life to a civilian-academic one. It also gives recommendations on how to best support military veterans in obtaining their nursing education and academic goals.

Burnout in Emergency Room Nurses

Catherine Blatchford, Emily Finnegan, Danielle Harvey, Sophia Kontoes

Faculty Advisor: Melissa Duprey, Ed.D.

A Commonwealth Honors Project

This scholarly project explored the negative impact on nurses working in the emergency department. Findings included a discovery of conditions nurses are exposed to in the emergency department, as well as environmental factors that contribute to burnout. Understanding the impact of burnout helps to establish interventions necessary to create a productive and safe work environment which will allow nurses to perform their job to the best of their ability.

Self-Care in the Nursing Profession

Caitlyn Dowd, Grady Harris

Faculty Advisor: Janna Trombley

There is a large self-care deficit among nurses in all health-care settings. Years of emotional expenditure through empathy and caring for patients can cause emotional and physical strain on nurses. Research reveals that patient care could be at risk as nurses experience fatigue from working long shifts and standing on their feet for the majority of a shift. Further research is indicated to address the need for more self-care interventions for nurses.

Generational Diversity in Nursing

Mallory Breen, Rachel Stier

Faculty Advisor: Janna Trombley

In health-care settings, nurses of all generations work together. Having nurses of varying ages in the hospital setting can result in both benefits and disadvantages. This literature review will focus on the generational diversity among nurses that exists in health-care settings.

Burnout Amongst Nurses in the United States

Laura Ernst, Colette Patenaude

Faculty Advisor: Janna Trombley

Research indicates that burnout is a prevalent problem in nursing due to many factors within the workplace environment. The social dynamics as well as the physical, emotional, and mental consequences of this career impact nurses' individual well-being, career retention, satisfaction, and feelings of accomplishment. These factors also impact the quality and safety of care provided to patients. This literature review will explore the factors impacting burnout.

Turnover Rate of New Graduate Nurses in the Pediatric Setting

Julia Carrier, Hade Dabbough, Jessica Fournier, Kylee Hurley

Faculty Advisor: Paula Bylaska-Davies, Ph.D.

High turnover rates in nursing and nursing staff shortages have been an issue in health care for ages, especially in pediatrics. A comprehensive literature review was performed to analyze the current knowledge and determine factors that contribute to the turnover rate in pediatrics and what can be done to reduce it, especially in new graduates. Articles were categorized under the themes of turnover in nursing, burnout in pediatric nursing, and experimentation.

The Effect that Nurse Competency Has on Inmate Care

Dominique Alves, Kathryn Johnston, Kelsey Konow, Rachel Dixson

Faculty Advisor: Paula Bylaska-Davies, Ph.D.

This research topic identifies the competencies that nurses working in acute care need in order to provide care for inmates from the prison setting. Based on the research, there are many differences between the training and orientation of nurses who provide care in the prison setting compared to nurses who work in acute care settings.

Nursing Staff-to-Patient Ratios

Megan LaMonda, Shaye Lane

Faculty Advisor: Janna Trombley

A Commonwealth Honors Project

Nurse-to-patient ratios have a strong effect on patient health and outcomes. When nurses are assigned to a high number of patients with acute/complex issues, the safety and health of patients are compromised, and nurses may not be able to provide quality nursing care. A qualitative and quantitative literature review showed that nurses with smaller assignments consisting of fewer acute and complex patient loads have higher rates of patient safety and care quality.

Efficacy of New Graduate Nurse Residency Programs

Dong Liang Dzindolet, Ayeh Tanteh

Faculty Advisor: Janna Trombley

A Commonwealth Honors Project

The objectives of this literature review are to establish the efficacy of nurse residency programs in the United States through performance reviews, staff retention rates, and confidence and competency surveys and to explore the multi-faceted benefits they provide to both novice nurses and health care organizations.

OCCUPATIONAL THERAPY

Evidence-Based Practice and Treatment in Inpatient Psychiatric Settings*

Kathryn Proulx

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Occupational therapy practitioners should be using the latest evidence to inform decision making. This study investigated how evidence-based practice (EBP) was used in the inpatient psychiatric setting, which treatment options were implemented, and which standardized assessments were used. Results showed that practitioners were using EBP, a combination of individual and group therapy, and assessments related to cognition, sensory processing, and ADLs/IADLs.

Types of Social Supports for Parents of Children with Disabilities*

Jasmin Serrano

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study examined how social supports affect parents of children with disabilities. This qualitative study used semi-structured interviews to explore how parents used social supports and where they find social support. Social supports were found to increase well-being, quality of life, and physical health. The study found that, overall, social supports were important to each individual but were difficult to acquire.

Occupation-Based Treatment in Hand Therapy*

Kathleen Carroll Sheehan

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study aimed to understand the role occupation plays in hand therapy, the frequency at which it is used, and the barriers that may stand in the way of using it with today's hand therapy clients. Therapists were interviewed about the techniques utilized in treatment and the results they see with their clients. The results indicated occupation-based treatment is important when motivating clients but is challenging to implement in certain contexts.

Parents' Perception of the Impact of Swimming on the Quality of Life of Children*

Victoria Marshall

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The objective of this study was to determine the perceived impacts of swimming on the quality of life of children with motor and sensory-based disabilities. Through the use of an online survey, parents reflected upon improvements seen within their child's everyday functioning since enrolling them in swim classes. Results of the study revealed that participation in swim activities had a positive impact on children with disabilities.

Teachers' Perceptions About Their Classrooms' Sensory Environments*

Heather Nadeau

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Elementary school classrooms are filled with children who have different learning strengths, weaknesses, and disabilities. It is important for teachers to design their classes in a way that promotes learning for all of their students. The purpose of this study was to understand K-6th grade teachers' perspectives about providing sensory-accommodating elements in their classroom environments and how these accommodations affect their students' abilities to learn.

College Students' Perceptions of the Current Immigration Crisis*

Elizabeth Cormier

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study was to explore college students' perceptions of the current immigration crisis happening at the U.S.-Mexico border. A survey was used to examine Worcester State students' knowledge about the detention centers at the border and motivation for immigration. The findings showed college students' were not fully informed about most issues, regardless of their age, major, or political affiliation.

Effects of Singing on Quality of Life in Parkinson's Disease*

Katelyn McCarthy

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study is to examine the effects of singing on quality of life for people with Parkinson's disease. According to the literature, the most common themes that define quality of life include physical health, social participation, and psychological well-being. Through the collection and analysis of qualitative data, it was revealed that singing can lead to improvements in all of these domains, therefore enhancing overall quality of life.

The Importance of Rituals Among Community-Dwelling Elders 65 Years or Older*

Lauren DePasquale

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study was to examine the importance of rituals and the impact they have on both health and wellness. Interviews were conducted with a small sample in one rural town in Massachusetts. The results showed that participating in meaningful rituals can positively impact quality of life and increase a sense of connectedness to family and friends.

Parent Perceptions of Cultural Competence*

Katelyn Surprenant

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Thousands of diverse children born in the United States with disabilities are served by predominantly White early intervention therapists each year. With ethnic culture playing an integral role in child development, this study examined this ethnic disparity by interviewing families about perceptions of their therapists and how they used culture in care, and opinions of overall treatment. Supportive, articulate, and client-centered therapists were found optimal for care.

Does the College Transition Impact Academics?*

Elisabeth Reed

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study explored the differences in high school to college transition between first- and continuing-generation college students, and described the supports and barriers students encounter during the transition. The study also explored how students performed academically freshman year, and their fulfillment of the student role. The transition was found to be more difficult socially than academically, and all students felt they fulfilled their student role.

Occupational Challenges of Veterans Reintegrating from Deployment to Civilian Life*

Kimberly Sinclair

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

An estimated 2.6 million individuals served during the Iraq and Afghanistan Wars. Going through the process of deployment and returning home is a substantial transition that can be extremely difficult for military personnel. This study explained the most common occupational challenges faced by veterans when transitioning home from deployment, and what community-based services were offered during this process.

The Effect of Being a College Student Athlete on Quality of Life and Well-Being*

Courtney Swanson

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study explored the quality of life (QOL) and well-being of college athletes and non-athletes. Similar surveys were distributed to each group. The results showed that college athletes perceived their QOL and well-being as higher than non-athletes. Colleges and institutions often focus on the QOL and well-being of athletes, but all students would benefit from additional services.

Life Satisfaction of Older Adults: The Impact of Work and Retirement*

Alexandra Bellerive

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

In society's current culture of continuing work later in life, it is important to explore the present perspectives of today's adults. This study sought to better understand if life satisfaction of community-dwelling adults aged 60 years and older is affected by the extent of their work. The results emphasized (1) the significance of choice in lifestyle after retirement, (2) the impact of active, genuine connections with others, and (3) the influence of activities.

Parent Perceptions of Children with SPD's Performance with Occupational Therapy*

Kristen Cuccoli

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study was to determine how parents of children with Sensory Processing Disorder (SPD) perceived their children performing daily activities at home while receiving clinic-based occupational therapy (OT). A survey was distributed asking parents how often they notice certain behaviors during activities of daily living and social participation. Results showed that OT had a significant impact on the behaviors associated with bathing and dressing.

Comparing the Accessibility of Public Buildings in Major New England Cities

Julia Caristi, Emma Dyer, Olivia Petrucci

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

A Commonwealth Honors Project

It is important to ensure everyone has equal access to community resources to optimize quality of life and social participation. Three versions of the Community Health Environment Checklist were utilized to assess public buildings in Boston, Providence, and Worcester. These assessments determined accessibility for individuals with visual, auditory, and mobility impairments. Our findings indicate that these spaces require improvements to increase accessibility.

Smart Technology and Seniors*

Casey Demers

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Smart technology has the potential to increase function and safety in seniors' lives, but it is often underutilized due to a lack of information. The purpose of this study was to determine the impact that an informational presentation about smart technology could have on seniors' interest in and opinions towards the applicability of smart technology. The results revealed that presentations positively impacted seniors' scores in the previously stated categories.

Parents with Disabilities' Perception of How Society Views Their Parenting Skills*

Cora Marica

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study was to explore how parents with a disability feel about society's view of their ability to parent. Individual interviews were held with six participants with physical disabilities. The findings revealed that society is generally accepting and supportive of them and they are satisfied with their own parenting skills.

Effects of Yoga on Academic Success in College Students*

Jordan Giebner

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The pressure to be academically successful in college is very high. The factors that contribute to a student's academic success have been found to coincide with many of the positive effects of participating in yoga. This study surveyed Worcester State students who attended yoga classes on campus and determined the effects of participating in yoga, the contributing factors to academic success, and the barriers to academic success among this sample of students.

The Impact of Alcohol Consumption on the Occupational Performance of College Students*

Caleigh Davis

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study examined the relationship among drinking alcohol, college students' performance in daily occupations, and their performance satisfaction levels. Often, they were unaware of the consequences drinking may have on their occupations such as sleep, education, employment, and socialization. The results showed that drinking alcohol can have negative or positive impacts on occupational performance of college students, depending on the occupation.

Occupational Therapy Practitioners' Perceptions of Medical Marijuana*

Julia Tinyszin

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The benefits and adverse effects of medical marijuana affect a great deal of concepts that concern a patient's overall occupational functioning. The purpose of this study was to measure occupational therapy practitioners' current level of knowledge of medicinal marijuana, its delivery methods, its adverse effects, and practitioners' attitudes towards medical marijuana use in their clients' daily lives.

Supports Utilized by Single Parents*

Amanda Allen

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Research shows that single parents face additional challenges compared to partnered counterparts. This study explored ways single parents receive support and how the supports influence overall quality of life (QOL) and social participation. Pragmatic childcare and emotional support from friends, family, and the community provided support to the single parents. The assistance they received played a vital role in their overall QOL and social participation.

Exploring Perceptions of Complementary and Alternative Medicine*

Carly Bell

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Increasing an individual's occupational performance and quality of life can be done in a multitude of ways including using complementary and alternative medicines such as yoga, acupuncture, and herbal supplements. This study explored perceptions of complementary and alternative medicine use in order to determine whether individuals felt that it increased or maintained their occupational performance and quality of life.

Occupation as Identity in Recent College Graduates*

Christopher Lazzaro

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Through ontological and phenological means, identity has been correlated to one's chosen occupations as dictated by the demands of the environment. During the transition from a full-time student to a full-time employee, recent college graduates undergo a time of flux, in which their identities can become undetermined. The aim of this study was to examine the influence of work and leisure occupations on the formation of identity and quality of life.

Student's Perceptions of Accessibility on Campus*

Kailee Tierney

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study was to explore current students' perceptions of the campus' accessibility and how it affected their participation in college. Students were interviewed about facilitators and barriers around campus. Results showed that students felt the campus was accessible and enabled their participation in classes and other on-campus events.

Sophomore Students' Perspective of Their Transition into College*

Kelly Myrto

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study was to discover sophomore students' perspective of their transition to college. The surveys were distributed on campus to sophomore students. Results showed class attendance, good time management, and quality of life were all significantly related to participation on campus.

PSYCHOLOGY

Brain Punching and Gene Expression

Clothilde Donarumo

Faculty Advisor: Brandi Silver, Ph.D.

The effect of opioid addiction on changes in the brain has become the center of attention for recent scientific studies. Experimentation involves rats to self-administer morphine with a control group using saline for comparison. A technique known as brain punching, in which regions of the brain, including the prefrontal cortex, are extracted, is performed. Those portions can then be analyzed with gene sequencing and qPCR for potential changes in gene expression.

The Effect of Learning Sign Language on an Infant's Development

Samantha Selvitelli

Faculty Advisor: Kathryn Frazier, Ph.D.

A Commonwealth Honors Project

Children's acquisition of language develops throughout childhood, whilst hitting certain milestones. Research has started to probe the question of whether teaching preverbal children sign language will allow their language skills to develop at a faster rate. This project presents a proposed method for studying the effects of learning sign language on a child's language skills and conversational application later in life.

The Effect of D-Serine on Intermittent Swim Stress-Related Deficits in the Morris Water Maze

Ryan David Tuttle

Faculty Advisor: Brandi Silver, Ph.D.

Funding Source: WSU Summer Undergraduate Research Grant

Intermittent Swim Stress (ISS) combines uncontrollable aversive stimuli similar to the Learned Helplessness protocol with cold water-forced swim stress. We used 36 mice to determine if the amino acid D-serine would ameliorate ISS-related latency deficits in the Morris Water Maze (MWM). A repeated-measures analysis of variance indicated that the ISS did significantly increase latency times in the MWM and that D-serine did not significantly improve performance.

Testing Cognitive Supports for Science Learning

Alyssa Niford, Carly Zielinski, Anna Figueiredo, Amanda Gevry

Faculty Advisor: Benjamin Jee, Ph.D.

Many adults incorrectly attribute seasonal change to Earth's proximity to the Sun. This study examines the effects of cognitive supports that aim to confront misconceptions and provide accurate knowledge. A sample of undergraduates received different cognitive supports—e.g., visual models and explicit comparisons—as they were taught about seasonal change. We will present preliminary results and discuss broader applications to science instruction.

The Role of Inhibition in Long-term Memory Specificity

Isabella Quattrucci, Benjamin Morin, Haley Brann

Faculty Advisor: Brittany Jeye, Ph.D.

The current study evaluated the specificity of long-term memory representations. Participants were asked to remember a series of items. Participants were then shown old items, similar related items, and new items, and participants indicated whether these items were exactly the same as the original items and their confidence. Results indicated that memory representations were very specific and that this specificity depends on inhibiting related details.

SCOFF: Eating Pathology Severity in International Vietnamese and Caucasian American Undergraduate Women

Maura Pelrine, Marissa Hayes, Amiya Phillips

Faculty Advisor: Champika Soysa, Ph.D.

International Vietnamese students (n = 44) reported greater eating pathology than Caucasian American students (n = 40). Post-hoc analyses indicated that international Vietnamese undergraduates living in the United States reported greater eating pathology than Vietnamese undergraduates living in Vietnam. These are novel contributions to the sparse literature on eating pathology in homogeneous samples of Asians.

Ethnic Identity and Prejudice Towards Ethnic and Religious Outgroups in Sri Lanka

Marissa Hayes, Maura Pelrine

Faculty Advisor: Champika Soysa, Ph.D.

Ethnic identity was greater in minority groups (Tamils, n = 52; and Muslims, n = 55) compared to the majority group (Sinhalese, n = 52) in Sri Lanka. Adding to the literature, we established that religious prejudice towards outgroups accounted for the relationship between ingroup ethnic identity and ethnic prejudice towards outgroups for those engaged in conflict (Sinhalese and Tamils), but not for the non-conflicting ethnic group (Muslims).

The Trifecta: Metacognitive Awareness, Time Warnings, and Exam Performance

Michaela White

Faculty Advisor: Emily Soltano, Ph.D.

A Commonwealth Honors Project

This project investigates how time warnings and metacognitive awareness influence students' achievement. It also compares metacognitive awareness about preparation for the exam and the grade students expect to receive for those in lower versus upper division classes. Overall, it was found that time warnings may negatively impact exam grades and that students demonstrated low levels of metacognitive awareness.

Instagram Influencers: A Content Analysis and Focus Group Analysis of Influencer Images

Sara Darman

Faculty Advisor: Kathryn Frazier, Ph.D.

A Commonwealth Honors Project

This project will present findings from two studies. First, a content analysis of top-followed Instagram influencers examined the prevalence of toxic elements in their images. Second, focus group sessions explored how female undergraduates discussed these images and whether they were viewed as harmful. Results indicate that these processes are intersectional, with race influencing both beauty ideals and the extent to which images are deemed relevant to the self.

Picture Imperfect: The Effect of Time Spent on Instagram and Body Esteem

Samantha Kowalchek

Faculty Advisor: Kathryn Frazier, Ph.D.

Social media usage has seen a significant surge in prevalence over recent years. Past research has knit increased time spent on media and decreased body esteem closely together in emerging adults. Quantitative surveys measured demographic information, daily media usage, and self-evaluated body esteem. As hypothesized, important effects related to gender and race were observed.

Does Premature Birth Have an Impact on Fitness Capabilities as One Ages?

Erica Hanlon

Faculty Advisor: Kathryn Frazier, Ph.D.

Premature birth poses many risks for the baby during early stages of development, but also can have effects on long-term health. This project considers the question: Are middle-aged adults born preterm less physically fit than those born at term? This project proposes a method of studying the effects of premature birth on physical fitness in adulthood.

Stress, Well-Being, and Social Support in Emerging Adults

Jessica Birchenough, Lilly Brochu, Christina Conrad, Julia Eldean, Gissell Hernandez, Colleen Kenney, Samantha Kowalchek, Michael Levesque, Mikayla MacNeil, Jessica Moore, Carly Zielinski

Faculty Advisor: Nicole Rosa, Ph.D.

Emerging adulthood, the developmental period from age 18 to 25, is marked by increasing independence, identity exploration, and major life changes. Using data from an emerging adulthood nationwide sample, three projects examined the relationships between stress, well-being, and social support. The roles of additional factors, such as gender and social media usage, are explored. Findings from this work contribute to our understanding of emerging adults and their needs during this life stage.

The Effects of Self-Construals on Memory

Taylor Whittredge, Ashley Hogan, Anna Grady, Arianna Navedo

Faculty Advisors: Nicole Rosa, Ph.D., Jacquelyn Raftery-Helmer, Ph.D.

Funding Source: Worcester State Foundation Faculty Grant

A Commonwealth Honors Project

Self-referencing provides a memory benefit by connecting new information to the self. Research has shown individuals with interdependent self-construals benefit both from self and other referencing. We will examine whether college students with interdependent self-construals show enhanced other referencing effects relative to those with independent self-construals. This project will highlight the role of self-construal in memory processes.

SOCIOLOGY

War on Sex

Catherine Sweeney

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The goal of this research is to determine what a “normal sex” life is to college students at Worcester State University. The significance of this study is the insight it provides into what an “average” college student’s sex life is and how it is affects other aspects of the student’s life, like family, friends, mental health, and overall health in their everyday lives and life overall.

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Celebration of Scholarship and Creativity
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