

CELEBRATION OF
**SCHOLARSHIP
& CREATIVITY**



WORCESTER
STATE
UNIVERSITY

2019

2019 PRESENTATION SCHEDULE

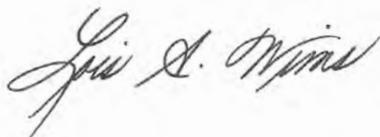
	North Room (C 111)	South Room (C 110)
8:30-9:20	<p>Yale IPC Presentation: Solving the Crisis of the South China Sea <i>Jaymi-Lyn Souza, Nicholas Clark, Tim Jarvis, Noah Aurelio</i></p>	<p>Massachusetts' Role in the Institution of Slavery <i>Laura Tormey</i></p> <p>More than Suffrage: Early Feminism in Comparative Perspective <i>Ashley Timmons</i></p> <p>The Complex Asian American Experience: People of Color or People of Privilege? <i>Mendrick Banzuela</i></p>
9:30-10:20	<p>Engagements, Encounters, and Experiences with Diversity at Worcester State <i>Stephanie McGrath, Courtney Garrahan, Cali Hetherman, Kacie Huntley, Manasseh Konadu, Jenna Letizia, Tavian Miranda, Anders Svendsen</i></p>	<p>The Global City Standard: A Struggle for Belonging in Worcester, Mass. <i>Colin Houle</i></p> <p>Kink, Consent, and the College Experience <i>Erica Gilman</i></p> <p>Our Local Bodega: The Impact of Franchise Dollar Stores on Urban Communities <i>Shannon Goldberg</i></p>
10:30-11:20	<p>Bringing History to Life: The Betsy Ross Squad <i>Nicole O'Connell, Lillian McPherson, Liam O'Malley, Ryan Daige, Trey Palczynski</i></p>	<p>Journalism in Nazi Germany <i>Aidan DuPont</i></p> <p>German Propaganda <i>Derek Wood</i></p>
11:30-12:20		<p>Existential Anthropology <i>Timothy Jarvis</i></p> <p>Hitler Detained <i>Robbie Tucci</i></p> <p>Disabilities in Nazi Germany <i>Erin Haggerty</i></p>

CELEBRATION OF SCHOLARSHIP & CREATIVITY

Welcome to the twelfth annual Worcester State University Celebration of Scholarship & 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. The day is filled with a variety of presentations, panels, posters, and performances across every discipline of study from the natural sciences, arts, humanities and social sciences.

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

Cloning of At4g19430, a Protein of Unknown Function in *Arabidopsis thaliana*

Zakaria Amellal

Faculty Advisor: Aleel Grennan, Ph.D.

Arabidopsis thaliana is a flowering plant that is used as a model organism. Our gene of focus is At4g19430, whose protein has an unknown function and no known domains. The protein is predicted to be localized to the plastid of petals, sepals, and stigma. Elucidating protein function can give clues on flowering. The experiment focuses on cloning the gene, overexpression of the gene in plants, and tagging the protein to determine localization.

Characterization of Acoustic Landscape as a Proposed Monitoring Tool in Spring Peepers (*Pseudacris crucifer*)

Ashley Emery

Faculty Advisor: Steven Oliver, Ph.D.

Amphibian populations have been in steep decline in the past few decades. It is difficult to collect accurate demographic data on frog populations. Frogs are acoustically active, and this offers a tool for estimating the breeding populations of Spring Peeper (*Pseudacris crucifer*) using recordings collected at dusk. Our results suggest acoustic monitoring can serve as a reasonable proxy for more invasive, and potentially damaging, sampling methods.

***Xenopus* Development**

Serena Iacovelli, Elizabeth Devaney, Brenda Thomas

Faculty Advisor: Daron Barnard, Ph.D.

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

The recombinant virus protein PIV5 is known to inhibit IFIH1 function. It has been hypothesized that the IFIH1 protein is responsible for regulating translation of mRNA during oocyte maturation (meiosis) in *Xenopus laevis*. The goal of this study is to generate PIV5 mRNA transcripts and then inject these transcripts into immature oocytes. If IFIH1 plays the proposed role in mRNA activation and regulation, the PIV5 should affect the oocyte maturation process.

The Effect of Carbon Dioxide in Cassava Leaf Anatomy

Natalia Lamourt

Faculty Advisor: Aleel Grennan, Ph.D.

Due to rising carbon dioxide in the atmosphere, we need to learn how plants are going to respond to ensure there is consistent food supply to feed global population. To investigate the effect of rising carbon dioxide, seven different cultivars of cassava (*Manihot esculenta*) were grown under ambient and elevated carbon dioxide. The differences in leaf thickness and intercellular air spaces were measured to determine the impact of elevated carbon dioxide on leaf anatomy and ultimately photosynthesis.

Modeling Pathogenic Bacteria of the Lung Using a Chemostat System

Janeisa Givins, Erin Doherty

Faculty Advisor: Maura Pavao, Ph.D.

Chronic Obstructive Pulmonary Disease (COPD), Cystic Fibrosis, and pneumonia are common and devastating conditions. This project involved the use of a fermenter and chemostat system to study pathogenic bacteria of the lung microbiome during increased carbon dioxide levels. Resident microbes first established themselves in defined lung medium then were challenged with known pathogens. This model system could test the effects of antibiotic on the lung microbiome and also complement *in vivo* studies.

Mapping and Identification of Worcester State University Trees

Robert Graham

Faculty Advisor: Aleel Grennan, Ph.D.

Worcester State University is home to an impressive tree collection; however, there is little to no record of the species present on campus. The purpose of this research is to map and accession the living collection for educational opportunities. In this study Geographic Information System (GIS) technology, USDA Data, GPS data, and taxonomy are used to locate and identify the species. With the collection mapped and accessioned, Worcester State University can be represented as an arboretum.

IFIH1 in *Xenopus laevis* Development

Elizabeth Devaney, Brenda Thomas

Faculty Advisor: Daron Barnard, Ph.D.*Funding Source:* Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

To better understand mechanisms responsible for translation regulation in meiosis, we are utilizing *X. laevis* oocytes. mRNA for the interferon induced with helicase C domain 1 (IFIH1) gene has been observed in stage VI oocytes, suggesting the IFIH1 protein could be responsible for translational regulation in oocyte maturation. Successful cloning will allow for analysis of the gene sequence, and manipulation of oocytes through overexpression of the protein.

Validation of a Shade Plant Model

Hoang Vo, Bernice Mensah

Faculty Advisor: Aleel Grennan, Ph.D.*Funding Source:* WSU Academic Affairs Faculty Scholarship/Creative Activity Grant, Aisiku Undergraduate Summer Research Fellowship

The ability to survive and thrive in the shade is not limited to just those plants found in deep woods. There are still gaps in knowledge about how these plants develop due to the lack of a strong model system. Previous studies suggest that *Arabidopsis thaliana* plants with a mutation in a chloroplast division protein have a similar phenotype to shade plants. This observation was validated by a direct comparison with shade-grown *Arabidopsis thaliana*.

Factors Influencing the Ability of the Transcription Factor Twist1 to Initiate the Epithelial-mesenchymal Transition, a Hallmark of Carcinoma Metastasis⁺

Arlind Dervishaj, Rafet Amoor, Redi Metali

Faculty Advisor: Jennifer Hood-DeGrenier, Ph.D.*Funding Source:* Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

Metastasis accounts for 90 percent of cancer deaths. It occurs when cancer cells detach from the primary tumor and enter circulation. The Twist1 transcription factor promotes this detachment by initiating the epithelial-mesenchymal transition. This study investigated how the phosphorylation and/or dimerization state of Twist1 affects its ability to induce the epithelial-mesenchymal transition. Expression of tethered Twist-Twist1 homodimer or Twist-Hand2 heterodimer both induced cells to lose attachment, suggesting that they trigger the epithelial-mesenchymal transition.

Assessing Antibiotic Susceptibility of Bacteria to Newly Synthesized Drug Derivatives via Minimum Inhibitory Concentration (MIC) Studies

Molica Pen

Faculty Advisor: Roger Greenwell, Ph.D.

Funding Source: Dr. Imogiele Aisiku, M.D. '92 Interdisciplinary Research Grant

Antibiotic resistance is a global pandemic as bacteria become less susceptible to existing antibiotics. This research is part of an interdisciplinary research project to create new antimicrobial compounds for disease treatment. A drug screening assay was developed to test selected compounds against a range of various bacteria. *S. aureus* and some additional bacterial strains were susceptible to thielavin derivatives, some with MICs as low as 4 µg/mL.

Identifying the Protease Responsible for Processing SapB in *Streptomyces Coelicolor**

Edward Poku

Faculty Advisor: Roger Greenwell, Ph.D.

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

SapB is a morphogenetic peptide important for aerial mycelium formation by the filamentous bacterium *Streptomyces coelicolor*. SapB is a 21 amino acid protein generated by the posttranslational cleavage and modification of the 42 amino acid RamS protein. The protease responsible for the cleavage of RamS to SapB is currently unknown. This research focuses on elucidating the peptidase(s) involved in removing the leader resulting in the production of mature SapB.

How Does Removing Nitrates Affect Pea Plant Growth?

Alyssia Bonacquisti, Ambar Silva, Danny Asfoura, Michael Card

Faculty Advisor: Aleel Grennan, Ph.D.

Nitrogen deficiency is a problem for plants and will impact their growth and development. The project's goal is to assess the effect on pea plant growth when NO₃ is removed using the split 3 root experiment. A decrease in leaf chlorophyll content, nitrate transporter gene expression, and less growth in the roots of the no NO₃ group are the expected results.

The Effects of Phosphorus on Basil's Flower and Root Growth

Robert Graham, Erica John, Zivar Khalighi, Emelyn Rivera, Suellen Rodrigues

Faculty Advisor: Aleel Grennan, Ph.D.

Ocimum basilicum – basil – was examined to see if a higher concentration of phosphorus would result in improved root growth and more prominent flowering. This was done in a split-root system in which two halves of a basil plant's root were placed and planted into separate containers using the same soil for each compartment, and different mineral nutrients were added. We expect increased flowering in the side with excess phosphorus.

The Effects of Potassium Deficiency on Root Architecture in Snowbird Peas

Molica Pen, Ivonne Flores, Sam Fontaine, Vrushali Patel, Meena Chelvan

Faculty Advisor: Aleel Grennan, Ph.D.

Potassium is an important macronutrient for plant development and functioning, playing an important role in enzyme activation, photosynthesis, and root production. A deficiency of potassium will decrease plant functions and photosynthesis. Using a split-root system, the effects of a potassium deficiency were tested on three pea plants. A decrease in growth of the roots, both in terms of diameter and surface area, and changes in gene expression are expected.

Iron Abundance and Absence and the Effect on Plants

Murray Rubin, Adrian Novas, Christarsha Young-LeMar, Mario Zguro

Faculty Advisor: Aleel Grennan, Ph.D.

Iron is a necessary element used by plants for crucial and fundamental life processes. The objective was to investigate whether the deficiency or abundance of iron would affect gene expression during development. Using the split-root design, we treated three bean plants with varying levels of iron to study normal and deficient iron levels. Selected for their easy susceptibility to iron, the bean plants will alter total development at each specific iron level.

Assessing the Interactions of *Streptomyces Coelicolor* with Other Bacteria

Bellamy Nguyen

Faculty Advisor: Roger Greenwell, Ph.D.

Bacteria in nature interact and compete with one another for space and nutrients. Some bacteria will secrete antibiotics as part of this battle for resources. The goal of this research is to identify interactions of different bacteria with the soil bacterium *Streptomyces coelicolor*. Identifying the signals produced by these bacteria will allow improvement of antibiotics production capabilities.

Soil Microbial Communities' Influence on Tree Coverage in a Response to pH and Antibiotic Resistance

Elizabeth Armstrong, Emily Bumpus, Nicole Eliason, Delany Kenny

Faculty Advisor: Aleel Grennan, Ph.D.

By comparing three locations across Worcester State University's campus, our research aims to evaluate how varying soil communities affect microorganism growth. This will focus on evaluating how deciduous trees and understory coverage affect the surrounding microbial biodiversity by investigating pH levels and antibiotic resistance within the soil components.

BUSINESS ADMINISTRATION AND ECONOMICS**Ensuring the Sustainability of a Student-Centered Organization: The Intersection of Leadership, Structure, Mission, and Madness**

Zoe Bates

Faculty Advisor: Jay Mahoney, Ph.D.

A Commonwealth Honors Project

This work explores the recent history of the Worcester State University Enactus team, including mission, structure, strategies, and environmental variables. Research on leadership theories, university programs, and personal experiences reconcile what should, could, and does happen within the world of student leadership. This analysis has been utilized to dictate the impact of student leadership while creating strategic plans for team development and continuity.

CHEMISTRY**Ruthenium-Catalyzed Oxidation of Alcohol**

Michael Connor, Joshua Buck

Faculty Advisors: Jeremy Andreatta, Ph.D., Kathleen Murphy, Ph.D.

As a project for CH 435: Advanced Laboratory Experience, previous research was confirmed and expanded upon. The experiment involves the synthesis of $\text{RuCl}_2(\text{PPh}_3)_3$ as a catalyst and its use in an air-sensitive oxidation of 1-phenylethanol to acetophenone. This project also examines replacing 1-phenylethanol with other alcohol substrates.

Room Temperature Catalytic H-D Exchange on Arenes Using a D2O Source

Maxwell Kimball, Kevin Kouassi

Faculty Advisors: Jeremy Andreatta, Ph.D., Kathleen Murphy, Ph.D.

Deuterated compounds are used to study pharmaceutical mechanisms and may slow drug metabolism. Deuteration is costly and intolerant of functional groups. This study expands upon previous work, using platinum on carbon as a catalyst to exchange aromatic hydrogens without modification of functional groups. This study adds common biological groups and amino acids to the tested functional groups. NMR, IR, and air-free environments were used.

Blackstone River Analysis: Upstream and Downstream of the Wastewater Treatment Plant

Emma Greenberg

Faculty Advisor: Kathleen Murphy, Ph.D.

Blackstone River water was collected up- and downstream from the Upper Blackstone Wastewater Treatment Plant and assessed. Turbidity, conductivity, pH, and nitrate were measured using Vernier probes, and calcium and chloride concentration were determined by gravimetric analysis. All the analytes tested were of higher concentration downstream, but calcium was absent in both river samples. Future work will include analysis of various metals and typical personal care products (PPCPs).

Removal of Water Contaminants Using Iron Nanoparticles

Samer Hammoodi, Kim Anh Vu

Faculty Advisors: Jeremy Andreatta, Ph.D., Kathleen Murphy, Ph.D.

The removal of pollutants from water can be expensive and energy intensive. The use of iron nanoparticles, where the iron has been sourced from recycled razor blades coated with activated carbon, has been studied as a project for an advanced lab (CH490). These materials provide a cost-effective, green approach to water purification. The purification capacity of the easily separated nanoparticles will be quantified.

Synthesis of Para-Benzoyl Substituted Pincer Ligands and Complexes

Alexandria Macaruso, Morgan Nelson

Faculty Advisor: Jeremy Andreatta, Ph.D.

A Commonwealth Honors Project

Pincer ligand metal complexes have been used as catalysts in a wide variety of applications. This project aims to synthesize and characterize a series of para-benzoyl substituted pyridine ligands and their transition metal complexes. Future work will focus on studying the electronic properties of these complexes and their application toward the catalytic reductions of CO₂ among other transformations.

Synthesis and Evaluation of Metabolites of GLS362E, an Antibacterial Lead Compound

Kim Anh Vu, Renata Lima, Han Nguyen

Faculty Advisor: Weichu Xu, Ph.D.

Funding Source: WSU Summer Undergraduate Research Grant

Clostridium difficile infection caused by a gram-positive bacteria is one of the major health issues today due to its contagion and recurrence. An N7-substituted guanine derivative, GLS362E, has shown highly selective antibacterial activity against *C.diff*. The metabolites of this lead compound were synthesized and purified to enhance the development of the drug.

First-Principles Study of Platinum Clustering on a Graphene Surface

Christopher Jackson

Faculty Advisor: Joseph Quattrucci, Ph.D.

In this computational study, the formation of platinum clusters on a graphene surface was investigated. Platinum atoms were placed on the surface and the system was relaxed to a minimum energy through first-principles calculations using density functional theory. The final position and energies of the system were studied to examine the size, stability, and energy of the clusters and the energy associated with the mobility of the platinum atoms on the surface.

Computational Study of Molecular Hydrogen Spillover Mechanism Over a Pt-Decorated Graphene Surface

Samer Hammoodi

Faculty Advisor: Joseph Quattrucci, Ph.D.

Graphitic materials are capable of storing atomic hydrogen. The spillover mechanism was investigated for hydrogen storage. After the minimum energy path (MEP) for the dissociation of molecular hydrogen to atomic hydrogen was established, additional calculations were performed to establish a model MEP.

Electrical Tuning of PNP Catalysts

Maxwell Kimball

Faculty Advisor: Jeremy Andreatta, Ph.D.

Transition metal catalysts bearing PNP ligands perform a wide variety of desirable reactions including ethanol to butanol conversion. This project aims to modify the electronic properties of the PNP ligand by varying the para-benzyloxy moiety. The resulting manganese complexes will be studied as catalysts for the conversion of ethanol to 1-butanol, which has a higher energy density and can be used as a biofuel in non-modified engines.

Catalytic Formation of Imines: Optimization of Reaction Conditions

Joshua Buck

Faculty Advisor: Margaret Kerr, Ph.D.

Catalytic amination of alcohols is well described in the literature. However, the catalytic formation of imines is relatively unknown. A reaction using $[\text{Cp}^*\text{IrCl}_2]_2$ to form an imine from benzyl alcohols mediated by a carbonate base was previously developed in the Worcester State research lab. This research focuses on optimizing the reaction conditions and yield determination, and compares imine and amine formation.

Synthesis of Novel Depsides as Antimicrobial Compounds

Renata Lima

Faculty Advisor: Weichu Xu, Ph.D.*Funding Source:* Dr. Imoigele Aisiku, M.D. '92 Interdisciplinary Research Grant

The discovery of new antibiotics is critical to global health. Depsides, lichen secondary metabolites, have shown antibiotic, anti-inflammatory, analgesic, antipyretic, antiproliferative, or antiviral activities. New depsides are prepared and screened for antibacterial activity against both Gram-positive and Gram-negative pathogens. The structures of these compounds are confirmed by the spectra data from H NMR, IR, and MS.

Cleaning Supplies: Implications for Human Health and the Environment

Jacquelyn Andry

Faculty Advisor: Karina Barseguian, Ph.D.

Cleaning supplies have become a necessary part of our household routine. With ever-increasing attention to hygiene and shiny-look industry today offers a big variety of laundry detergents, drain cleaners, and furniture-polishing wipes. This report presents how the ingredients of these commonly used cleaning supplies may affect human health. The safety of main functional chemicals and possible health risks from a prolonged exposure or a non-proper use are discussed. The safer alternatives of cleaning agents with the same cleaning efficiency are offered for consideration.

Nail Polish Removers: A Green Profile

Ama Aninakwa

Faculty Advisor: Meghna Dilip, Ph.D.

Ingredients in nail polish and nail polish removers, such as dibutyl phthalate, toluene, and formaldehyde, are known toxins. In this study, the active ingredient in traditional and greener nail polish removers was quantified using a standard addition Nuclear Magnetic Resonance (NMR) spectrometry method. This data was combined with price of product, efficacy of product, toxicity, and other factors to generate a green profile for each nail polish.

Computational Analysis of the Stabilization Energy Contributions of Individual Hydrogen Bonding Interactions in the Guanine Tetramer

Alexis Melton, Devon Hassan

Faculty Advisor: Eihab Jaber, Ph.D.

Telomere sequences form guanine complexes and are stabilized by eight guanine-guanine hydrogen bonds and ligand bonds to a cation. Investigations utilizing *ab initio* methods have provided insight into the interactions that contribute to guanine complex stability. A computational method facilitates the characterization of hydrogen bonds' energy contribution to the complex's stability and breaking of individual bonds. This method is utilized to find the formation dynamics of stacked tetraplexes.

CHEMISTRY and BIOLOGY

Catalytic Formation of Imines: Synthesis Development for the Creation of Novel Antibiotics

Emily Mattson, Sonializ Rosario

Faculty Advisor: Margaret Kerr, Ph.D.

Catalytic amination of alcohols is well described in literature. However, the catalytic imination is relatively unknown. The catalyst $[\text{Cp}^*\text{IrCl}_2]_2$ was used in the imination of benzyl alcohols using aromatic amines, mediated by a carbonate base. Imines were successfully synthesized from various aromatic amines and alcohols, verified by gas-chromatography mass spectrometry (GCMS). Formation of imines is attractive as it has the potential to be applied to the synthesis of novel antibiotics.

COMMUNICATION

“Fitspiration”: How Fitness Accounts and Advertising Campaigns Shape Women’s Ideas on Body Image

Julie O’Melia

Faculty Advisor: Julie Frechette, Ph.D.

This project examines social media’s influence on women’s body images by examining the use of “fitspiration,” a term used on social media to categorize various fitness accounts meant to inspire women (and men) to become “fit.” This research was previously published by “The Global Critical Media Literacy Project” under the faculty mentorship of Professor Julie Frechette.

Developing News Literacy Skills to Counter the Effects of Fake News

Taylor Hutchings, Caroline St. Peter, Matthew McNickles

Faculty Advisor: Daniel Hunt, Ph.D.

Fake news can take the form of fabrication, satire, parody, manipulation, advertising, and/or propaganda. News literacy focuses on developing critical thinking skills to evaluate the credibility of news sources. This presentation reviews how to identify the various types of fake news stories. The impact of fake news on society is also discussed. Finally, news literacy lesson plans created by students enrolled in a Fake News course are presented.

Fox News’ Fictitious Fearmongering

John Newcomb

Faculty Advisor: Julie Frechette, Ph.D.

This project considers how false media coverage of the Central American migrant caravans during the 2018 midterm elections spread xenophobic messages across the United States. Fox News seized on false xenophobic, right-wing theories that the caravans transported gang members and “unknown Middle Easterners” who would bring disease outbreaks. Throughout its coverage of the caravans, Fox News provided zero evidence to back up its claims. This project was previously published by “The Global Critical Media Literacy Project” under the mentorship of Professor Julie Frechette.

COMMUNICATION SCIENCES AND DISORDERS

Teaching Jumpstart Classroom Aides: Education and Application of Scaffolding Language for Diverse Learners

Sarah Farnham

Faculty Advisor: Susanna Meyer, Ph.D.

Americorps Jumpstart members were trained to provide language and literacy stimulation to preschoolers. An instructor provided scaffolding training on temporary supports to assist children in completing tasks. The study determined the impact of training using pre- and post-surveys. Data collected from 32 undergraduate students showed a statistically significant increase in knowledge. Self-assessment scales showed an increase in perceived support and confidence.

Speech and Linguistic Fluency in Adults Who Do and Do Not Stutter

Sierra Chauncey

Faculty Advisor: Kenneth Melnick, Ph.D.

The purpose of this study is to compare speech and linguistic fluency of adults who do (PWS) and do not (PWNS) stutter. Participants were 5 PWS and 5 PWNS. Participants were administered a hearing screening and formal comprehensive language assessment, then participated in a conversational speech sample. It is anticipated that PWNS will show greater speech and language fluency than PWS.

Writing Analyzation Standardization: A Proposal to Normalize Methodology in Evidence-Based Practice

Melissa Higginson

Faculty Advisor: Colleen Karow, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant
A Commonwealth Honors Project

Propositional density (PD), a measure of information richness, is obtained through language analysis and may predict cognitive decline during aging. PD methodologies vary across the literature and disciplines of study. After investigating these differences and preparing writing samples from a cohort of 33 elderly women, a systematic method was developed. Results of the methodological analysis and subsequent PD ratings will be discussed.

Comparison of Performance on Four Tests of Executive Functioning Across the Adult Life Span*

Alison Wright

Faculty Advisor: Colleen Karow, Ph.D.

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

Formal assessment of executive functioning (EF) is difficult because EF skills are utilized during novel or unpredictable situations. This study investigated EF test methods and the theories used to construct them. Forty-eight adults, ages 20-85, completed four tests of EF and language samples. Results between tests were compared and the effects of language load on performance were analyzed. Applications to clinical practice will be discussed.

COMMUNICATION SCIENCES AND DISORDERS & OCCUPATIONAL THERAPY

How Accessible Is an Urban Performing Arts Theater?*

Anne Quinlan, Kayla Hogan

Faculty Advisors: Joanne Gallagher Worthley, Ed.D., Susanna Meyer, Ph.D.

The objective of this study is to determine accessibility of a local performing arts theater for patrons with disabilities. The Community Health Environment Checklist identifies barriers for people with low-vision, mobility, and hearing disabilities. Recommendations are provided to the theater.

COMPUTER SCIENCE

Aged Population – Living Alone

Thanh Truong

Faculty Advisor: Elena Braynova, Ph.D.

This project examines data on the United States' older population collected by American Community Survey from 2011 to 2015. The survey data is prepared for processing, analyzed statistically, and visualized in order to predict rate at which older men live alone. Different models and algorithms are used. The classifiers are evaluated for the accuracy.

Detecting and Characterizing Trends in Online Mental Health Discussions

Kathleen Law

Faculty Advisors: Jonathan Gemmill, Ph.D. (DePaul University), Daniela Raicu Ph.D. (DePaul University), Karl Wurst, Ph.D.

Funding Source: National Science Foundation Research Experience for Undergraduates Grant

Mental illness is a widespread public health concern that affects many individuals. Increasingly, people are turning to social media to discuss their mental health. The result is a rich data set from which to draw insights about mental health conversation over time. This study collected data from mental health forums on the popular website, Reddit. Topics were extracted from this data, and trends of these topics were observed and quantitatively confirmed. This was a joint research project with Dante Chakravorti, University of California, Irvine.

Generative Adversarial Networks

Michael Rose

Faculty Advisor: Elena Braynova, Ph.D.

Generative Adversarial Networks (GANs) are systems of neural networks that are concerned with creation. Given some data, GANs use Bayesian posterior sampling to derive new likely samples. This project applies cutting-edge neural network research to hand-gathered data, and creates new, never-before-seen data in the form of images.

Data Analysis of NYPD Complaint Data for the Year 2018

Laura Guertin

Faculty Advisor: Elena Braynova, Ph.D.

This project analyzes the New York Police Department Complaint Data for 2018, and studies how attributes depend on each other. Some interesting relationships are visualized. This project solves a classification problem for the “Level of Offence,” “The Sex of a Criminal,” and “Which Neighborhood a Crime was Committed” using different models and a variety of algorithms. Constructed classifiers are evaluated for efficiency.

Geospatial and Time Analysis of Traffic Fatalities

Christopher Jackson

Faculty Advisor: Elena Braynova, Ph.D.

Data mining and clustering techniques can be used to identify trends in accident time, location, and contributing factors such as sobriety or weather to increase emergency responder preparedness. This project uses clustering and data visualization to identify hot spots in time and location surrounding traffic fatalities in the United States. This project identifies several time and location hot spots corresponding to alcohol-related fatalities and particularly dangerous highway conditions, respectively.

Social Media Opinion Mining: Using Sentiment Analysis to Predict the 2020 Presidential Election

Jake Price

Faculty Advisor: Elena Braynova, Ph.D.

Sentiment analysis refers to using code to analyze opinions of written text. This project uses sentiment analysis on Twitter posts related to the 2020 United States presidential election to evaluate users’ opinions of the candidates. The goal of this project is to find the ratio of positively and negatively classified tweets for each candidate and to visualize this data with graphs and charts to see which candidate currently has the best odds of winning the election.

Analyzing Crime Information – What Can We Discover?

Jhan LaTulippe

Faculty Advisor: Elena Braynova, Ph.D.

The goal of this project is to look at a crime data set and to uncover patterns that may exist within it. The data set contains more than 2 million records of crimes committed in the United States between 2006 and 2016. Questions studied are: (1) “Can crime type be predicted for a given location?” and (2) “Can we determine where resources should be allocated to hinder higher than normal crime rates?”

Exploring Operating Systems with MINIX 3

James Blash

Faculty Advisor: Karl Wurst, Ph.D.

MINIX 3 is a small open-source operating system designed to be secure, reliable, flexible, and easy to modify. The focus of this project was to investigate the structure of the source code and determine how the operating system works, specifically MINIX 3's included scheduling algorithm. A number of alternative algorithms will be implemented and their efficiency compared to the included scheduler.

Analyzing a Speed Dating Data Set

James Njangi, Ren Dutczak

Faculty Advisor: Elena Braynova, Ph.D.

This project uses a database for speed dating in order to determine the extent to which race, gender, age, personality traits, and personal interests factored into the process of finding a match. It focused on a classification problem. Classifiers were constructed using different models and a variety of algorithms, and evaluated for efficiency. The results gathered show that people have preferences for personalities over physical appearance, people that share the same interests as them, and age. Also, the main attributes people wanted to look for in a match were intelligence, humor, and shared interests.

Terrorist Attacks — What We Can Predict?

Jarid Aker

Faculty Advisor: Elena Braynova, Ph.D.

Terrorist attacks are planned, but it is nearly impossible to predict them without any indication. In this project I analyze a data set on terrorist attacks in Europe from 2000 to 2016. The data was pre-processed and cleaned before I used it. I also analyzed this data statistically and visualized some of the information, as well as tried to predict the type of attack that will happen in the future.

EARTH, ENVIRONMENT, AND PHYSICS

Ten Years of Carbon Sequestration by a Central New England Forest: Long-Term Trends and Response to Climate

Andrew Etheridge

Faculty Advisor: Allison Dunn, Ph.D.

Forests are the earth's largest terrestrial carbon sink, and understanding their response to Earth's changing climate is pivotal. We use a 10-year record of diameter data collected from more than 800 trees in Harvard Forest in Petersham, Mass. We analyze the tree growth data for response to climate variables such as precipitation and temperature (annual, spring, and summer). The study also examines species-specific growth response patterns to climate variables.

Boston Harbor Ocean Assessment

Lauryn Mulcahy, Anthony Shepard, Brooke Holden

Faculty Advisor: William Hansen, Ph.D.

Boston Harbor is a complex estuary with numerous hydrologic and anthropogenic features. It is crucial to understand the major impacts a rising sea level may cause in the future for Boston, Mass., residents as well as the vulnerability of the harbor. Land use change is a component that be used to show the influences humans have on water quality and resources. The changes can alter how the hydrographic features behave from anthropogenic activity.

Monomoy Island Coastline Transformation

Kaylee Klenk, Enida Sulaj

Faculty Advisor: William Hansen, Ph.D.

According to the Massachusetts Shoreline Change Project, the coastlines of Cape Cod's Monomoy Island have been receding. This research will analyze the change in the shoreline between 1994 and 2000. Light Detection and Range (LIDAR) data will be added to the Massachusetts Shoreline Change Project data in order to examine the shoreline in further detail. It will be determined how the features of the area have changed with a before and after map. Results will show a significant change between the two coastline features.

Worcester Tree Canopy Recovery Using LIDAR

Lynne Stone, Andrew Ravenelle

Faculty Advisor: William Hansen, Ph.D.

Worcester was the main site of the Asian longhorned beetle outbreak in 2008 and was also greatly affected by an ice storm in December of the same year. This analysis was conducted to see if the forest canopy has fully recovered 10 years after these serious impacts took place. Using Light Detection and Range (LIDAR), false color images of the canopy from before, during, and following both events were analyzed. It was found that the tree canopy is regrowing, with many years of recovery to go.

Beaver Populations Impacting Land Use in Worcester County

Jillian Smith, Clay Degnan, Tony Pen

Faculty Advisor: William Hansen, Ph.D.

This project's goal is to discover how significant the landscape change has been over past years since beaver trapping laws have been altered in Worcester County. Using Light Detection and Range (LIDAR) and Massachusetts Geographic Information System (MassGIS) data, it was found that water body coverage has expanded due to an increase in beaver populations. These results suggest that human development may be impacted by these changes, which may require beaver trapping regulations to be altered.

Floodplain Assessment in Leominster, Mass.

Kay Paradis, Faye Rhault, Jameson Bastarache

Faculty Advisor: William Hansen, Ph.D.

FEMA prepared a now-outdated analysis of floodplains in Worcester County, Mass. The purpose of this research is to create an updated analysis. This data will be used to analyze development on floodplains to aid in land management. Using Aeronautical Reconnaissance Coverage Geographic Information System (ArcGIS) and Light Detection and Range (LIDAR) applications, undeveloped/developed sites that are at risk of flooding were identified in Leominster. This is useful to determine potential build sites where the properties will have a minimal flood risk.

Water Quality and Morphology of Connecticut River Flowing through Springfield, Mass.

Cameron Dietz

Faculty Advisor: William Hansen, Ph.D.

This project studies how Springfield, Mass. affects Connecticut River water quality and morphology. The goal of this study was to find how the National American Energy Alliance plant and the Springfield Water and Sewage plant affect water quality and morphology. The data being used is thermal imagery and water quality data of the area taken from the Massachusetts Geographic Information System (MassGIS) website. Results show that the sewage and energy plants have an impact on the river.

Massachusetts Land Use and Population Change in Urban and Suburban Boston

Alex Washburn, Jackie Tsanga

Faculty Advisor: William Hansen, Ph.D.

This project examined areas in and around Boston to analyze land use and population change from 1991 to 2010. The extent of land cover change was analyzed, and the gradient of population per square mile from the city to the suburbs was determined using data from the Massachusetts Geographic Information System (MassGIS) website. Land use change and population change data was used to create a map showing gradient of population per square mile. It is determined that suburban development causes more land cover change than urban.

Analysis of Cape Cod Land Use

Conor McDonnell

Faculty Advisor: William Hansen, Ph.D.

Land use of Cape Cod was analyzed for changes between 1951 and 1999 to show its effects on coastal erosion, local water quality, and native plant and wildlife populations. This research examines changes to Cape Cod's natural landscape by analyzing the overall damage by land use on the Cape.

Risk Assessment of Fort Devens, Mass.

Christina Duplease, Lindsay Lapan

Faculty Advisor: William Hansen, Ph.D.

Fort Devens is a former military base located 35 miles outside of Boston. Established in 1917, the permanent base was placed on the EPA's National Priorities List in 1989 and officially closed in 1996. Traced contaminants from the base to surrounding watersheds present a risk to anthropogenic and natural resources. Massachusetts Geographic Information System (MassGIS) data sets were used to analyze the study area. The result reveals areas which are at the most risk of exposure to contamination from the base.

The Effects of Industry on the Morphology and Quality of the Nashua River

Kurt Allaway

Faculty Advisor: William Hansen, Ph.D.

The Nashua River is a 37.5-mile-long tributary of the Merrimack River that runs through northeastern Massachusetts. The river has received discharge from plastics and paper industries. This study used high-definition Light Detection and Range (LIDAR) data to analyze the morphology of the Nashua River. The results from the study will show the effects of industry on the structure and habitability of the Nashua River and will show how industries can affect any rivers in this manner.

Land Use Change Impacts in the Quaboag River Watershed

Amanda Amory

Faculty Advisor: William Hansen, Ph.D.

The Quaboag River watershed landscape has been affected by urban change since the 1850s, significantly affecting water quality. This study analyzes these impacts, employing Geographic Information System (GIS) and remote sensing to process historic and raster data to characterize the drainage, slope, and Land Use (LU)/Land Cover (LC), and to model rainfall runoff to support water quality analysis, development planning, and storm water systems.

An Analysis of Air and Land Surface Temperature Variations Throughout New England

John Veneziano

Faculty Advisor: Nabin Malakar, Ph.D.

Both hot and cold temperatures are shown to have large impacts on human health. It is therefore important to monitor these seasonal temperature fluctuations. This project investigates trends and patterns of temperatures during winter and summer months for the northeastern United States. Various remote sensing temperature data from 2002 to 2011 (Moderate Resolution Imaging Spectroradiometer [MODIS] and Landsat) were used to analyze monthly temperature variations throughout New England.

Early Successional Dynamics in a Central New England Forest Following Clearcut

Douglas Dillon

Faculty Advisor: Allison Dunn, Ph.D.

Forests undergo ecological succession as they regrow after harvest or other disturbances. This study uses diameter-at-breast-height (DBH) data from a forest stand harvested in 1990 at Harvard Forest in Petersham, Mass. We track ~600 trees with DBH of > 5cm over 10 years to examine early successional dynamics.

EDUCATION

A Real Headache: How Migraines Affect the Developing Brain and How We Can Help*

Tyler Pietras

Faculty Advisor: Diane Cooke, Ph.D.

Migraine headaches are the second most prevalent form of headaches and are characterized by a pulsing sensation and aura. They are also becoming more common within school-age populations. There is a correlation between those who have migraine headaches and poorer than average academic performance. Schools can help these students by helping to spread awareness and being attuned to the needs of this population.

Cerebral Palsy*

Rachel Niddrie

Faculty Advisor: Diane Cooke, Ph.D.

According to the Centers for Disease Control and Prevention, cerebral palsy is the most common motor disability in children. Approximately 1.5-4 per 1,000 births produce a child with cerebral palsy. This project will explain the definition, diagnostic procedures, treatment, and outcomes of children with cerebral palsy.

The Neuropsychology of Metastatic Cancer in the Pediatric and Adolescent Population*

Erin Fontaine

Faculty Advisor: Diane Cooke, Ph.D.

This project summarizes the literature of the most common pediatric and adolescent cancers that become metastatic cancer, as well as the neuropsychology and effects on the brain from these types of cancers and their treatment. Overall, childhood cancers respond better to treatment than adults, but their long-term side effects may be worse due to the stage of brain and body development.

Gliomas: The Neurological and Neuropsychological Basis and Effects on Student Learning Behaviors*

Julia Anderson

Faculty Advisor: Diane Cooke, Ph.D.

Gliomas are the most common type of brain tumor in both adults and children, and they occur from cancerous glial cells in the brain. The variation in glioma diagnoses results in a wide array of symptoms and treatment plans. In addition to the medical symptomatology and related treatment effects, gliomas have significant impacts on student learning behaviors in the classroom setting. This project focuses on the current research and literature to examine the expansiveness of these impacts and provide insight to those responsible for the education of individuals with this diagnosis.

Childhood Epilepsy: A Look Through a Neuropsychological Lens*

Jessica Richard

Faculty Advisor: Diane Cooke, Ph.D.

Epilepsy is a debilitating disorder. Seizure activity during childhood can dramatically impact brain maturation, which can lead to numerous educational deficits such as executive dysfunction, learning disabilities, poor academic achievement, and memory difficulties. In order to better support students, it is important to understand common characteristics of epilepsy and its educational impacts. This project is a review of the current research and literature on epilepsy and the developing brain.

Pediatric Multiple Sclerosis: The Neurological and Educational Implications for Children*

Samantha Maestro

Faculty Advisor: Diane Cooke, Ph.D.

Multiple sclerosis is an autoimmune disease that attacks the central nervous system by breaking down myelin sheaths. Although it typically develops during adulthood, an increasing amount of cases have been diagnosed before the age of 18. Multiple sclerosis can impact a child physically, cognitively, socially, and/or emotionally. This presentation will review the current research on these impacts, as well as how they may influence a child in the educational setting. Educational supports, accommodations, and modifications will also be presented.

The Educational Implications of Pediatric TBI*

Jillian Scaficchia

Faculty Advisor: Diane Cooke, Ph.D.

Pediatric traumatic brain injury (TBI) is a leading cause of childhood injury. Moderate to severe TBI receives more medical attention, while mild TBI often goes undiagnosed or the impacts on the developing child are minimized. Research demonstrates that pediatric TBI can be disruptive to cognitive, behavioral, and social/emotional development. This research explores the impact that TBI can have on the developing child and the educational implications.

Closed Head Traumatic Brain Injury in Adolescents and its Impact on Psychological Functioning*

Rachel Hillegass

Faculty Advisor: Diane Cooke, Ph.D.

Traumatic brain injury (TBI) has been classified by the Centers for Disease Control and Prevention as a national crisis. Over the recent years, there has been an increase in TBI among adolescents, and more information about brain injuries has been gleaned as a result of new research. TBI can affect any area in the brain, which has the potential to impact several domains of functioning which, in turn, may lead to poor academic performance among adolescents.

Parasomnias in Children: Sleep-Wake Disorders with Neuropsychological Underpinnings and Functional Consequences*

Hunter Hoobler

Faculty Advisor: Diane Cooke, Ph.D.

This presentation summarizes a comprehensive literature review on parasomnias in children that includes information about diagnostic features, neurological and functional consequences, evaluation methods, treatment, and other relevant information. Despite the large body of research that exists on parasomnias, further scientific exploration is essential in order to effectively identify, evaluate, and treat individuals who experience symptoms and long-term effects.

Strategies for Teaching Fractions to Reduce Math Anxiety and Student Misconceptions

Katelyn Salsgiver

Faculty Advisor: Raynold Lewis, Ph.D.

A Commonwealth Honors Project

Fractions are an area of mathematics students often struggle with, causing math anxiety. Teachers can influence student understanding of and fluency with fractions. To successfully teach fractions, teachers must first understand them and have the ability to work with fractions conceptually. The goal of this project is to provide strategies and techniques for teaching fractions to reduce math anxiety and student misconceptions.

The Effects of Insomnia on the Child/Adolescent Brain and Learning*

Ashley Hardenstine

Faculty Advisor: Diane Cooke, Ph.D.

This poster explores how insomnia may affect the neurological, cognitive, and social/emotional functioning of children and adolescents. Particular brain regions such as the hippocampal region, frontal lobe, temporal lobe, hypothalamus, thalamus, and brainstem will be explored in their relation to initiating and maintaining sleep. Difficulties in initiating and maintaining quality sleep have negative educational implications for youth.

Neuropsychology of Pediatric Open Head Traumatic Brain Injury*

Jessica Connolly

Faculty Advisor: Diane Cooke, Ph.D.

This literature review focuses on open head traumatic brain injury (TBI) and the problems associated with it. For children this can lead to a plethora of problems that can hinder their educational trajectories. Symptoms following injury are mostly determined by the area of the brain that was damaged. The parts of the brain and their functioning will therefore be discussed as well.

Neurological Impacts of Epilepsy in Children*

Kaitlyn Patno

Faculty Advisor: Diane Cooke, Ph.D.

Epilepsy is prominent in many children's lives. It affects them not only physically but emotionally, behaviorally, and psychologically. To better understand how epilepsy affects these children, it is important to understand which part of the brain was affected as well as comorbid diagnoses they may have. Children with epilepsy may struggle in many ways in their lives, so the whole child must be understood to better serve these children in education and out in the world.

ENGLISH

Much and Nothing: Voices of the Early Students from the Worcester Normal School

Nicole O'Connell

Faculty Advisor: Cleve Wiese, Ph.D.

Funding Source: Alumni Association Advisory Board Grant

A Commonwealth Honors Project

Combining public history, women's history, and local history, this project preserves the words of Worcester State's earliest students by centering on diaries (1875-1904) from the WSU Archives. A complete digital transcription is being made and selected entries are being compiled into a book and interspersed with historical context, insights, and reflections upon the subject matter.

HEALTH SCIENCES

Analysis of Organized Sports in High School and the Effect on Obesity

Kendra Faldetta, Haroon Amarkhail, Kalee Horgan, Lauren Mowles

Faculty Advisor: Mariana Calle, Ph.D.

Childhood obesity affects 20.6 percent of American children, according to the Centers for Disease Control and Prevention. Physical activity has become a major focus of health science, and is often recommended to combat or prevent obesity. There is evidence to suggest that joining an organized sport can help decrease the likelihood of a high school student becoming obese. This review analyzes the potential link between playing high school sports and prevention of obesity in high school students.

Mental Health of College Students on Massachusetts State Campuses

Monika Asomugha, Allison Dyberg, Kaitlyn Hall, Rachel Sharp

Faculty Advisor: Mariana Calle, Ph.D.

Counseling centers represent a key resource to help college students achieve optimal mental health. This cross-sectional study aims to evaluate Worcester State University's Counseling Center, to determine whether students are being provided with proper resources, and comparing these resources to other state universities in Massachusetts.

Does Gestational Diabetes Expose Women to a Higher Risk of Type 2 Diabetes Within Five Years Postpartum?

Isabel Richards, Stacey Arsenault, Jennifer Jutras, Andrea Lopez

Faculty Advisor: Mariana Calle, Ph.D.

The growing number of women developing Type 2 diabetes within five years of having had gestational diabetes is a concern. Gestational diabetes affects up to 18 percent of pregnancies as it increases the risk of complications during pregnancy such as high blood pressure, large birth weight, early birth, and more. This project aims to analyze current literature to provide an update and improve the understanding of the relationship between gestational diabetes and future risk of Type 2 diabetes.

Association Between Low-Income Areas and High Rates of Sexually Transmitted Infections

Meghan Silva, Victoria O'Connor, Julianne Bernazani, Mitchell Cupp, Momduo Bomeh

Faculty Advisor: Mariana Calle, Ph.D.

The spread of Sexually Transmitted Infections (STI) is a problem worldwide. Increases in STI rates in low-income communities is a concern. The purpose of this review is to evaluate whether income is associated with sexual health, and determine what cultural differences influence these statistics. A majority of STIs are preventable and treatable; however, lack of access to care caused by poor socioeconomic status leads to an increase in STI prevalence.

HEALTH SCIENCES and SOCIOLOGY**Group Exercise and Stress Among College Students**

Theodore Girard

Faculty Advisors: Andrew Piazza, Ph.D., Alex Briesacher, Ph.D.

Group exercise is becoming more common on college campuses; however, research remains limited. Most studies focus on the physical benefits, which covers only one aspect of wellness. Another important feature of wellness is mental health. Because college students experience elevated levels of stress due to a high workload, mental health is important. This study surveyed students to see if group exercise is associated with lower levels of stress.

HISTORY AND POLITICAL SCIENCE**Ancient Greek Art and the African Diaspora**

Marta Leitao

Faculty Advisor: Alison Okuda, Ph.D.

When discussing ancient history, we often refer to Ancient Egypt or Ancient Greece as distinct and isolated cases rather than constituents of a larger whole. Ancient Egypt in particular is often studied as a separate entity from the rest of the African continent. The intention of this project is to showcase how an ancient Cypriot limestone sculpture can serve as an example of the ways in which African civilizations converged with and influenced Greek civilizations.

Worcester State University and the United Nations

Timothy Jarvis

Faculty Advisors: Mark Wagner Ph.D., Tona Hangen, Ph.D.

The Worcester State University Model United Nations program is an experience for students to engage international relations issues and instruct passionate middle schoolers from the greater Worcester area's public schools. WSU students working to inspire youth interest into international policy is a challenging and rewarding opportunity that will be remembered. This presentation will explain why as WSU ushers in a new age as an official United Nations Academic Impact member, international affairs ought to be promoted on campus.

Checker Players

Kassandra Liquori

Faculty Advisor: Alison Okuda, Ph.D.

Jacob Lawrence's *The Checker Players* is small but has many intimate details that tell a whole story. In the painting, five men are playing checkers and two are writing on the chalk wall in the back, perhaps keeping tallies of the games. Does what appear to be very ordinary – checkers and a chalk wall – have deeper meaning? Does this meaning reflect the era during which the painting was created? Or is the artwork just what it seems, a group of guys playing checkers and keeping track on the wall?

Massachusetts' Role in the Institution of Slavery**

Laura Tormey

Faculty Advisor: Alison Okuda, Ph.D.

This work explores what the role of slavery was in post-abolition Massachusetts. The people who called Massachusetts home collectively agreed that slavery was immoral, but on the other hand it was thought of as a lucrative business. This work examines slavery in relation to business, including the mill industry and cotton trade in the North. The post-abolition period in Massachusetts is discussed as well as the use of slave-grown cotton, abolitionist movements, and the lasting impact of the contradiction of abolition in Massachusetts.

Activist Theater and the LGBTQ Community

Katrina Dilorio

Faculty Advisor: Erika Briesacher, Ph.D.

The topic of my project is activist theater as it relates to the LGBTQ community. As this is a community that is marginalized worldwide, creating social change for this group is critically important. As theater is known as a catalyst for shifting perceptions, it is a prime outlet to bring about this change. Through my research, I examine the historical impact of activist theater, noting major social changes that have come about as a direct result.

Yale IPC Presentation: Solving the Crisis of the South China Sea**

Jaymi-Lyn Souza, Nicholas Clark, Tim Jarvis, Noah Aurelio

Faculty Advisor: Nathan Angelo, Ph.D.

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

This presentation focuses on the October 2018 participation in the annual Yale International Policy Competition by four Worcester State history majors. The project is a proposed solution to the South China Sea Crisis. We proposed that conflict be resolved by giving sovereignty over the region to China, but ensuring the rights of the smaller nations by mandating that they have the right to use the region. Incentives were given to each nation involved in order to have a policy that all nations involved, including the Chinese and United States, would willingly sign on to.

More than Suffrage: Early Feminism in Comparative Perspective**

Ashley Timmons

Faculty Advisor: Tona Hangen, Ph.D.

Early feminism, which in some locales included women's suffrage, is often seen through rose-colored glasses, when in reality it was built on ideals of racism, classism, prejudice, and, in some places, nationalism. Depending on location and circumstance, early feminism was a force for suffrage, equality, and nationalist movements designed to push back against imperialism and current regimes.

HISTORY AND POLITICAL SCIENCE and VISUAL AND PERFORMING ARTS
Bringing History to Life: The Betsy Ross Squad**

Nicole O'Connell, Lillian McPherson, Liam O'Malley, Ryan Daige, Trey Palczynski

Faculty Advisors: Erika Briesacher, Ph.D., Lisa Kramer, Ph.D.

In a continuation of their "WWI Letters" performance last semester during the "Bringing History to Life" exhibition at the Oaks house in Worcester, students will share the story of the "Betsy Ross Squad," a group of flag-sewing members of the Daughters of the American Revolution who provided support for soldiers fighting overseas. The students will also speak about the process of conducting research and transforming their work into a theatrical portrayal.

LIBERAL STUDIES
The U.S. Prison System Is Failing

Agbai Anya

Faculty Advisor: Erika Briesacher, Ph.D.

The U.S. criminal justice system needs to be reformed. The steadily increasing numbers of imprisoned Americans contributes to the fact that the United States has more people incarcerated than Japan, Australia, Canada, and Europe combined. This study will examine the impact of the prison system on U.S. budgets, marginalized communities (especially the African American community), and effective rehabilitation alternatives.

Redefining Environmental Psychology

Alana Ranney

Faculty Advisor: Erika Briesacher, Ph.D.

Environmental psychology is defined as the interdisciplinary study of one's ability to learn based on one's social and physiological environment. This research will instead focus on the correlation between nature and one's personal growth and learning development. The results yield that there is an insufficient amount of research on the relationship between children exposed to the natural environment and their ability to flourish, despite their interdependence.

Creating Diverse Lessons for ELL Students with Trauma

Arianna Muhlidis

Faculty Advisor: Erika Briesacher, Ph.D.

In the 2018-19 school year, 2,026 new students enrolled into the Worcester School District. Of those students, 801 of them were English Language Learners (ELL) and at least 200 of these students suffer from emotional and behavioral disorders. This project will address how the lesson plans that teachers create can address the diverse psychological and language needs of our ELL students.

Seeing Beyond the Screen

Deborah Njonjo

Faculty Advisor: Erika Briesacher, Ph.D.

For years, social media has integrated into the lives of countless individuals. This has allowed people from all backgrounds to voice their opinions on various topics, including women's body shape. The ideal body type was thin, but now the ideal body type is an hourglass figure. This study examines whether social media use has an impact on women's self-conception, self-esteem, and body dissatisfaction.

The Future of Worcester's Canal District

Brendan Vargeletis

Faculty Advisor: Erika Briesacher, Ph.D.

Worcester's recent approval of the overhaul of the Canal District has created many questions for potential impacts for the city as a whole but, more importantly, the residents. This poster displays projections and development intentions but also explores outcomes for the residents of the Canal District, providing expectations for city residents and how Polar Park and the arrival of the Worcester Red Sox will affect them for better or worse.

The Influence of Media-Portrayed Beauty Standards on the Wealth of Ghanaian Women

Samuel Appiah

Faculty Advisor: Erika Briesacher, Ph.D.

This project explores women's perceptions of media beauty ideals and how developing a personal and subjective opinion on what beauty is can positively influence women, with economic, social, and cultural impacts. This study challenges the concept of broadly accepted cultural beauty ideals, encouraging individual definitions of beauty. This project analyzes diverse examples of beauty standards in the media and identifies their sociocultural foundations as well as their implications.

Mapping the Mind

Nicholas Clark

Faculty Advisor: Erika Briesacher, Ph.D.

Using notable works and research from various disciplines that detail all the identifiable limits and organizations of the mind, this project introduces a new perspective on consciousness, cognition, and conceptualization of reality. Focusing on breaking the mind down into three parts – sensation, perception, and conceptualization – linguistic experiments as well as visual, auditory, and sensational illusions will be used to identify each part of the mind.

Special Education Programs in Worcester's Inner City

Shelby McCready

Faculty Advisor: Erika Briesacher, Ph.D.

In the United States, public education for students with disabilities is regulated by the Individuals with Disabilities Education Act, a federal program. Inner-city special education programs face diverse issues and differ from the national average data on special education students. The extent to which schools in Worcester follow education requirements will be examined and differences in charter and public-school special education programs will be investigated.

Feminist Journalism

Sundra Lam

Faculty Advisor: Erika Briesacher, Ph.D.

Two stigmatized words in society today are "journalism" and "feminism." Feminism itself is already stigmatized and people steer away from that title because of the negative stereotypes. Journalism is also stigmatized in society because of the "fake news" phenomenon. Both concepts deal with people's trust. This project defends journalism and feminism, to highlight the positive effects a feminist journalism would have on society.

Emotional Intelligence and the Arts

Erin Gallagher

Faculty Advisor: Erika Briesacher, Ph.D.

This project focuses on the intersections of social emotional development theory and teaching the arts in early childhood education, especially in the infant and toddler years. This project examines how the concepts and practices interact with each other, as well as their combined benefits for children's development. Additionally, these concepts can be applied to diverse classroom populations, including typically developing children, gifted children, and those on the autism spectrum. The purpose of this work is to highlight the ways all of these students benefit from art, music, and drama at very early ages.

Being Interdisciplinary in the Military

Mabell Teixeira

Faculty Advisor: Erika Briesacher, Ph.D.

Service members are highly trained in their designated fields, and have their own culture of work. Being a service member and working as a human resource specialist makes being interdisciplinary very helpful, allowing one to be a good resource in dealing with different personalities and different approaches that people may take in their daily activities as they serve such a unique community. The goal of this project is to highlight the ways in which interdisciplinarity positively prepares one for, and impacts, military service.

Why Female Attorneys Are Abandoning the Legal Practice

Yvette Fagan

Faculty Advisor: Erika Briesacher, Ph.D.

Presently, women represent more than half of law school graduates who go on to pass the Massachusetts Uniform Bar Examination. However, female attorneys remain under-represented in the larger law firms. My research will examine the possible social issues and obstacles that affect their abilities to remain practicing in the field of law.

LIBERAL STUDIES, HISTORY AND POLITICAL SCIENCE, and PHILOSOPHY**Existential Anthropology****

Timothy Jarvis

Faculty Advisors: Erika Briesacher, Ph.D., Elena Cuffari, Ph.D.

"Existential Anthropology" attempts to answer three basic questions: (1) "What is the condition of humanness, and how has this been shaped by our environment?" (2) "How does humankind fit into the universe, including into the everyday spaces and places we inhabit?" (3) "What is the human effect on that universe and thus on the conditions of human existence?" This project promotes a renewal of enquiry into these questions that explores the human condition and the physical space of humanity. This could drive a new philosophical movement that might be termed "meta-anthropology."

MATHEMATICS**A Guide to Calculus**

Molly O'Brien

Faculty Advisor: Jason Hardin, Ph.D.

There are several approaches when it comes to studying calculus. Calculus is important because it is a necessary tool for almost all STEM careers. More and more high school students are having the option to take calculus. This paper focuses on data from several studies of students who took calculus in high school. It will give suggestions on the best approach to calculus and how to be successful.

Introduction to Babylonian Mathematics

Nanette Moulin, Clara Gaitos, Monika Kicilinska
Faculty Advisor: María Fung, Ph.D.

In this poster, we will present the work of Caspar Wessel, a Norwegian map surveyor, who developed a systematic and full theory of complex numbers. We will focus on complex number addition, multiplication, division, powers, and complex conjugates.

Varahamihira

Emily Carens, Jason Truax, David Campbell
Faculty Advisor: Maria Fung, Ph.D.

Varahamihira was a prolific astronomer/astrologer of the sixth century CE who lived in central India near the end of the two-century-long rule of the Gupta Empire. Through this presentation, we will present background on Varahamihira, the work he did in mathematics, and the impact he had on the subject. Topics include, but are not limited to, the Trigonometric Pythagorean Theorem, Table of Sines, and circle geometry.

Babylonian Mathematics

Nathaniel deVries, Molly O'Brien, Harmony Estabrook
Faculty Advisor: Maria Fung, Ph.D.

Modern mathematicians have much to gain from considering the mathematical insights, accomplishments, and thought processes of ancient scholars. In the second century BCE, scholars in Babylon compiled records of astronomical data and observations on clay tablets. This project will explore some of these early historical developments in astronomy and sexagesimal numeration and how these ideas continue to influence the modern mathematics we are familiar with today.

Ptolemy

Matthew Kopacko, Travis Campbell
Faculty Advisor: Maria Fung, Ph.D.

We will look at Ptolemy's major surviving work, the *Almagest*, and in particular his work on how he created his chord list and used it to solve a geometric model of a sundial. We will also be looking at his work on the motion of spheres and how he used them with planetary motion.

The Evolution and Mysterious Nature of Pi

Jacob Elbirt
Faculty Advisor: Noah Daleo, Ph.D.

We will delve into the history of the irrational, transcendental number pi and its uses, occurrences, and vast importance across mathematics. In doing so, we will examine various algorithms for computing pi and conduct tests for each, focusing on efficiency and how they have evolved over time. Finally, we will investigate the real-world applications and surprising places in which pi appears in nature.

Modeling Federal Interest Rates to the Bull and Bear of Stock Markets

Meaghan Dougherty, Gert Dervishaj
Faculty Advisor: Timothy Antonelli, Ph.D.
A Commonwealth Honors Project

In this project we attempt to model the relationship between federal interest rates and the stock market. Using data recorded over many years, we utilize concepts such as stochastic modeling to determine if our hypothesis of how interest rate changes manipulate the bull and bear of different markets is correct. In this model we expect to see that as interest rates increase, stock market prices will decrease.

Detailed Analysis of Contributing Biases to the United States Gender Wage Gap

Meaghan Dougherty

Faculty Advisor: Jason Hardin, Ph.D.

A Commonwealth Honors Project

This project is an analysis and explanation of social biases often unaccounted for in the calculation of the gender wage gap found by an analysis performed on August 2018 data. This analysis determined the effects of these biases and proves that, although the wage gap formula does capture gender discrimination in pay, many of the biases examined play into different margins of the reported wage gap and increase the size of these reported figures.

Predicting the Time to Drop an Egg Using Mathematical Modeling

Kaila Minucci, Rachel To

Faculty Advisor: Timothy Antonelli, Ph.D.

The goal of this project is to calculate the precise time at which an egg needs to be dropped in order to hit a (voluntary) person walking at a constant speed below. Using mathematical modeling techniques, including Newton's first law, the time required was calculated and various complexities from the weight of egg to the stride length of the person walking were factored in. Parameter estimation techniques were utilized to analyze discrepancies between the model's prediction and data.

Applications of Number Theory in RSA Encryption

Neil Rao, Dakota Hinerth, Jason Truax, Shaylee Puleo

Faculty Advisor: Michael Winders, Ph.D.

In the past, number theory was thought to be one of the most "pure" forms of mathematics, in the sense that it had no applications. How times have changed! With the advent of high-powered computers, number theory is currently one of the most applied branches of mathematics. This project investigates one such application, RSA (Rivest-Shamir-Adleman) encryption. RSA encryption uses techniques from number theory to communicate information in a secure manner.

Bayesian and Measure Theoretic Extensions of Generative Adversarial Networks

Michael Rose

Faculty Advisor: Jason Hardin, Ph.D.

Generative Adversarial Networks (GANs) are a modern method of fitting probability distributions in very high dimensional space over non-traditional data sources (such as images, music, and videos). This project looks at the mathematical underpinnings of classical GANs and then shows further extensions to key components through the use of measure and Bayesian statistical theory.

The Stats on Stats

Emily Carens

Faculty Advisor: Jason Hardin, Ph.D.

In this study, I looked at the 2017 NCAA DIII Women's Volleyball Tournament statistics to determine if winning teams were outperforming losing teams in certain areas of the game. Through research and personal experience, I determined five categories to be tested: Kill Percentage, Dig Percentage, Total Points, Directly Earned Points, and Indirectly Earned Points. It was found that at the 95 percent confidence interval, winning teams had a significantly higher means in Kill Percentage, Dig Percentage, Total Points, and Directly Earned Points. However, there was no significant difference found in Indirectly Earned Points.

NURSING

The Effect of Education on Marijuana Usage

Grady Harris, Caitlyn Dowd

Faculty Advisors: Kimberly Dunker, DNP, Paula Bylaska-Davies, Ph.D.

The quality of drug education that adolescents receive in school may influence their marijuana usage and their understanding of the consequences of the drug. This review of the literature examined the correlation of classroom education methods, normalization of marijuana, and peer drug education to prevent future drug use. Further research is indicated to address the educational needs of this population related to future drug use.

Animal-Assisted Therapy: Impact on Social Interaction and Communication Skills of Children on the Autistic Spectrum

Liang Dzindolet, Megan LaMonda, Shaye Lane

Faculty Advisor: Melissa Duprey, Ed.D.

A Commonwealth Honors Project

Children diagnosed with autism spectrum disorder have difficulties with social interaction and communication, which can cause problems for nurses in determining chief hospital complaints. Upon review of relevant literature, the following research question was proposed: In children with autism, does the use of pet therapy increase social interaction and communication skills with healthcare personnel during hospital visits?

Nurse-to-Patient Staffing and the Effect on Patient Care and Safety

Mallory Breen, Rachel Stier

Faculty Advisors: Kimberly Dunker, DNP, Paula Bylaska-Davies, Ph.D.

A Commonwealth Honors Project

A question that has yet to be solved revolves around whether specific nurse staffing ratios for patients will provide better quality of care to patients and improve their safety while at the hospital. The research clearly shows that poor nurse-to-patient ratios have negative implications for nursing such as greater occurrences of falls, pressure ulcers, and medication errors.

Acupuncture in Pain Management on Patients with Autoimmune Disorders

Kaila Bavin, Katelyn Stevens

Faculty Advisor: Kimberly Dunker, DNP

Acupuncture is a form of alternative therapy that many people claim has changed their lives, helping them through many medical problems including chronic pain, all while avoiding harmful side effects of pharmacological agents. The research undertaken shows that the use of acupuncture directly affects the mood of patients, which can provide management of chronic pain. For nurses, it is imperative to know what alternative therapies patients have to manage their pain.

Nurse Fatigue: A Review of the Literature and Application to Nursing Practice

Jamie Cruz, Lauren McCarthy, Jennifer Rearick, Abigail Sniegocki

Faculty Advisor: Melissa Duprey, Ed.D.

A Commonwealth Honors Project

Fatigue among nurses is a recognized phenomenon in healthcare settings that requires physical, mental, and emotional expenditure of energy. The purpose of this integrative review was to determine the relationship between nurse fatigue and adverse patient outcomes in an effort to identify preventative measures and education to combat fatigue. It was concluded that nurse fatigue results from multiple internal and external factors and has been correlated with negative patient outcomes.

Verbal Abuse Against Nurses in the United States

Laura Ernst S.N., Colette Patenaude, S.N.

Faculty Advisor: Kimberly Dunker, DNP

Verbal abuse is a common phenomenon experienced by nursing professionals. While novice nurses and nurses in higher-stress units more frequently report abuse, any nurse is susceptible and can fall prey to harsh environments created by fellow nurses, physicians, patients, and family members. The research indicates that appropriate interventions to improve the situation are lacking; further studies are warranted.

Telemetry Compliance and Knowledge: A Review of the Literature and Application to Nursing Practice

Olivia Cahill, Colleen Walsh

Faculty Advisor: Kimberly Dunker, DNP

A Commonwealth Honors Project

Telemetry monitoring is a common practice among patients admitted to the hospital to monitor cardiac rhythms. Registered nurses on general medical-surgical units at a local hospital do not pay adequate attention to telemetry monitors on patients ordered for continuous heart monitoring. There is a decline in telemetry compliance, as well as a questionable level of competency, which poses a direct threat to patient safety.

OCCUPATIONAL THERAPY**College Students' Attitudes Toward Individuals with Autism Spectrum Disorder and Intellectual Disabilities***

Erin Stern

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Despite what seems to be increased awareness of autism and intellectual disabilities, the general population still lacks knowledge about how to effectively include individuals with these issues in a lifestyle where growth and development peak: college life. This study explores the origin of attitudes toward this population in a post-secondary environment in an effort to contribute to better understanding and inclusion of these individuals.

Examining Functional Health Literacy in Community-Dwelling Older Adults*

Kimberly Lapointe

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The objective of this research is to determine the prevalence of limited functional health literacy in community-dwelling seniors in Worcester County. Additionally, this research aims to determine which, if any, demographic variables relate to health literacy status. This research also aims to establish whether community-dwelling elders differ in functional literacy skills compared to older adults who reside in nursing facilities/hospitals.

Quality of Life and Social Participation Based on Length of Diagnosis for Persons with Multiple Sclerosis*

Melanie Dubbs

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study is to examine the relationship between the length of time one has been diagnosed with multiple sclerosis and his/her perceived quality of life and ability to participate in social interactions. The findings suggest that the length of diagnosis does not have a strong impact on social participation or quality of life; however, quality of life is influenced by the amount of social activities an individual participates in.

Food Allergy and Socialization*

Keri Riefenhauser

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The objective of this study is to determine the relationship between food allergies and socialization. The study analyzes which characteristics have an impact on social participation, including type of food allergy and length of time since diagnosis. The barriers for socialization and the methods for overcoming these barriers are also explored. Overall, the findings suggest that presence of a food allergy has an impact on social participation.

Gender Differences in Young Adults' Body Image and Self-Esteem*

Sarah Brakenwagen

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of the study is to better understand the prevalence and impact body image and self-esteem have on male and female college students. Two different surveys were used to assess body image and self-esteem of students at WSU. Results found males to have higher self-esteem and body image when compared to females.

Changes in Roles and Routines on the Path to Sobriety*

Michelle Beaulieu

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Discovering helpful intervention techniques for alcohol use disorder (AUD) is in high demand within today's society. This study aims to better understand the roles, routines, and social participation of those with AUD. The overall objective is to better inform healthcare professionals, specifically occupational therapy practitioners, in the development of more effective interventions, while addressing the growing need for research regarding addiction. The findings of this study suggest that the journey of sobriety is supported through establishing daily routines that allow for the development of healthy relationships, engaging in meaningful leisure activities, and participating consistently in AA meetings.

The Effects of Study Abroad Experiences on the Lived Experience of College Students*

Maeve Bradley

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study examines the interviews of six college students who had studied abroad in the past five years, and looked at the cultural differences that the participants encountered during their time abroad. Specifically, the study examines the reported differences in habits, roles, routines, and values between the participants' host country and their own culture and summarizes the benefits of studying abroad as reported by the participants.

Advocating for Occupational Therapy: What Efforts Are Practitioners Making?*

Kathryn Salemme

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study looks at the types of advocacy efforts occupational therapy practitioners have made on behalf of the profession. This study is based on an online survey sent to practitioners that contained 18 questions. The results showed that although practitioners were aware of the need to advocate, they were not advocating often. Advocacy efforts, specifically those conducted politically and through social media, benefit the profession by spreading awareness for not only the profession's needs, but also how they can benefit society.

Dance Classes for Those with Parkinson's Disease and the Effects on Quality of Life*

Rachel Folan

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Dance classes for those with Parkinson's disease are an emerging alternative therapy that is being used to increase a patient's quality of life. This research shows that the dance classes positively affect factors influencing quality of life. Through the use of surveys, the most influential factors were determined to be mobility, social participation, well-being, and self-esteem.

Aquatic Exercise and Fall Efficacy*

Reanna Locke

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study explored the relationship between elders' fall efficacy and participation in aquatic exercise programs. It was found that none of the participants feared falling regardless of gender, frequency, or duration of participation in aquatic exercise programs; participating to any extent has the ability to benefit one's fall efficacy. Occupational therapists should consider aquatic exercise for treatment of physiological and psychological factors impeding one's balance confidence.

How Does a Child's Gender Affect Parenting Style?*

Elizabeth Eisenbud

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

The purpose of this study is to discover how a child's gender affects parenting style and the discrepancy between the stereotypes for girls and boys. A survey was used to find parents' comfort level with their child participating in certain activities and to find the toys they believe their child enjoys. The results of this survey reveal that a child's gender affected which toys, activities, and colors the parents used to create their child's environment.

The Social Participation of Young Adults with Autism Spectrum Disorder: Parents' Perspectives*

Erin Foley

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study aims to describe the patterns of social participation of young adults with autism spectrum disorder (ASD). This qualitative study uses semi-structured interviews of parents to gain in-depth data about how this population interacts with peers, what barriers to social participation exist, and how parents feel about their child's social participation. This information highlights areas for supported professions, such as occupational therapy, to optimize the social participation and overall well-being of this population.

Factors Influencing College Students' Mental Illness Stigma*

Mikayla Miranda

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

Individuals with mental illness can face prejudice and negative interactions based on societal attitudes. This can greatly impact meaningful engagement in activities and wellness. This study examines the demographic information of college students that influences attitudes toward those with mental illness. Statistically significant interactions were found between gender and work experience.

Exploring the Lived Experience of Parents with Various Disabilities*

Dana Morgan

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This qualitative study explores the experiences of parents with various physical disabilities and conditions. Each participant partook in a semi-structured interview. All of the participants identified challenges, such as managing fatigue, parenting as children age, and facing judgment from society; however, their disabilities did not negatively affect their parenting.

Activities that Impact the Quality of Life for Elders*

Sarah O'Leary

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study explores the quality of life of seven community-dwelling elders in relation to their participation in instrumental, leisure, and social activities. A qualitative design is used, including a semi-structured interview and the Activity Card Sort, which is an assessment tool that consists of 89 photographs representing various activities. Themes found include internal motivation, change as a result of aging, and social supports. Participation in certain activities is found to have a positive effect on quality of life for elders.

The Impact of the College Transition*

Danielle Attardo

Faculty Advisor: Joanne Gallagher Worthley, Ed.D.

This study explores the impact of the college transition on students during their first year of college. During the transition into college there are many changes in students' roles, habits, and routines that can affect their overall health. The results show that the college transition has many negative impacts on the student in regards to mental and physical health. Post-secondary institutions should implement more programs to address all aspects of the transition.

PHILOSOPHY

Theory Selection Through a Feminist Lens

Elizabeth Pedone

Faculty Advisor: Frank Boardman, Ph.D.

Inductive reasoning is a cornerstone of scientific research; however, to feminist philosophers there is a disconnection between the aims of scientific reasoning and real scientific practice. This project aims to explain the problems raised by feminist philosophers such as Kathleen Okruhlik, chiefly the problems inherent in the current system of theory selection. It will then consider the implications of this in regards to Popper's deductivist account of reasoning.

PSYCHOLOGY

Perceived Social Support and Post-Traumatic Stress Symptomatology in War-Affected Sri Lankan Children

Ngoc Nguyen, Michelle Henry, Sarah Kendrick

Faculty Advisor: Champika Soysa, Ph.D.

We studied perceived social support (PSS) from parents, classmates, and teachers in relation to post-traumatic stress (PTS) symptoms in N = 60 Sri Lankan children, in the context of war. PSS from parents was significantly greater than PSS from classmates as well as from teachers. In addition, PSS from parents and PSS from classmates were significantly and inversely related to levels of PTS symptoms, but PSS from teachers was not.

Correlates of Juvenile Firesetting Behavior

George Dilling '18, Ngoc Nguyen, Allison Zeena '18, Michelle Henry

Faculty Advisor: Champika Soysa, Ph.D.

We identified social, emotional, and behavioral correlates of juvenile firesetting in n=128 parent reports and n=109 child reports. Furthermore, conduct disorder-related symptoms significantly predicted fire-related activity in parent and child reports, but Attention Deficit Hyperactivity Disorder (ADHD)-related symptoms did not. Parent reports of children's fire curiosity significantly predicted juvenile fire-related activity, but child self-reports did not.

Types of Eating Pathology in International Vietnamese and Caucasian American College Students

Ngoc Nguyen

Faculty Advisor: Champika Soysa, Ph.D.*Funding Source:* WSU Summer Undergraduate Research Grant

We examined aspects of eating pathology in n=41 international Vietnamese and n=40 Caucasian American college women. Body dissatisfaction had a higher incidence than bingeing, purging, and negative attitudes toward obesity in both groups of students. Further, body dissatisfaction had a higher incidence than (a) excessive exercising in international Vietnamese and (b) restricting in Caucasian Americans. We identified shared and unique aspects of eating pathology in these two cultures.

Cultural Differences in Eating Pathology Between International Vietnamese and Caucasian American College Women

Ngoc Nguyen

Faculty Advisor: Champika Soysa, Ph.D.*Funding Source:* Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant

We studied aspects of eating pathology in n=41 international Vietnamese and n=40 Caucasian American undergraduate women. Binge eating, purging, restricting, and negative attitudes toward obesity were higher in international Vietnamese than in Caucasian Americans. Targeting cultural variations in eating pathology may increase the effectiveness of therapeutic interventions.

Cultural Differences in Interpersonal Influences on Eating Patterns

Ngoc Nguyen

Faculty Advisor: Champika Soysa, Ph.D.*Funding Source:* WSU Summer Undergraduate Research Grant

We studied eating pathology in n=44 international Vietnamese and n=40 Caucasian American college women. International Vietnamese reported significantly greater peer and partner influences on eating behavior than Caucasian Americans reported. Further, peer influences in international Vietnamese and partner influences in Caucasian Americans predicted pathological eating, indicating cultural differences in interpersonal influences on eating pathology.

Choices of Postfeminism: Is There Really a Choice?

Melissa Higginson

Faculty Advisor: Kathryn Frazier, Ph.D.*Funding Sources:* Worcester State University Honors Program, Worcester State University Psychology Department

Postfeminism is a modern sensitivity that pushes sexual freedom of women for equality; however, it does not treat women equally. It groups women into categories based on heteronormative beauty standards and forces them to subjectify their bodies to gain power equal to men. A qualitative study of 25 young individuals considers how conflicting messages about sex are understood and how that translates into the individual's perceived sense of power.

Technology and Transportation: A Survey of Worcester-Area Older Adults

Kelsey Snodgrass

Faculty Advisor: Nicole Rosa, Ph.D.

This study explores how older adults who attend the Worcester Senior Center would be impacted by a shift to online payment for transportation to and from the senior center. In collaboration with the senior center, surveys were distributed to center visitors. Results indicate that seniors would be negatively impacted by a required move to online payment. Factors influencing this will be discussed along with potential solutions.

The Effects of Stress on Spatial Memory in Adult Male Mice

Jacqueline Kamins

Faculty Advisor: Brandi Silver, Ph.D.

Funding Source: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant
A Commonwealth Honors Project

This study will determine how stress influences the memory formation and recall abilities of mice. There will be two groups of mice: One will be handled regularly, and the other will have no handling. After five days of this process, these mice will undergo a three-day series of water maze trials. It is predicted that the non-handled mice will have higher levels of stress and will therefore have higher latencies to find the platform in the water maze.

Supports for Visual Learning in Math and Science Textbooks

Madison Marceau, Monica Greenlaw, Kelsey Bedard

Faculty Advisor: Benjamin Jee, Ph.D.

Funding Source: Department of Education

Math and science textbooks are rich with visualizations. The spatial layout of a figure can impact people's learning. We coded middle school math and science texts in terms of their supports for visual comparisons relevant to conceptual learning. We will present findings related to the types and frequencies of comparison-based supports in textbook images.

The Effect of Anthropomorphism on Conservational Views and Physiological Fear Response

Ashley Emery

Faculty Advisor: Brandi Silver, Ph.D.

A Commonwealth Honors Project

This project explores how anthropomorphism might affect participants' physiological reactions to a possibly dangerous animal as well as their views on conservation. We specifically focused our study on whether anthropomorphism could be used to increase people's positive attitudes toward animal conservation. Further, we explore if anthropomorphism can lower a person's physiological response to a typically dangerous animal.

Exploring the Relations Between Rationality and Intuitive Theories in Science

Ethan Borchetta-Platt, Kaitlynn Bishop, Ali Duchemin, Michelle Henry, Samantha Allen, Madison Armstrong, Victoria Baker, Jacqueline Borella, Alexis Carvalho, Bridget Casey, Nicole Correa-Rodriguez, Kamara Curry, Kennedy Damoah, Isabella DePasquale, Hayleigh Morgan, Shafira Myers, Mayralejandra Nunez, Olivia Petras, Jessica Silvera, Kelly Sugarman, Thomas Wedge

Faculty Advisor: Benjamin Jee, Ph.D.

People vary in their tendency to enlist rational/reflective thought processes in everyday reasoning. This project explores whether the tendency toward rational thinking relates to a person's performance on science problems that involve counterintuitive solutions. Results will be reported, and implications for science learning and instruction will be discussed.

Essentialist Thinking and Reasoning About Biological Evolution

Colleen Johnson, Elizabeth Pedone, Lauren Zajac, Gabrielle Plainte, Kelsey Allaway, Mehgan Beckman, Meeghan Cole, Shannon Davis, Rylee Donovan, Darla Faucher-Mott, Naishmed Llanos, Olivia Longo, Stefania Mensah, Sydney Ryan, Cindy Tran, Robert Tucci, Marissa Young

Faculty Advisor: Benjamin Jee, Ph.D.

Adults tend to think that members of a biological category share an “essence” that defines their category membership. Essentialist thinking can interfere with understanding biological evolution, which emphasizes within-species variation. Our research team tested whether adults’ estimates of the variability of features within biological categories relate to their performance on an evolutionary thinking test. Results are reported and the learning of scientific concepts is discussed.

How Female Socialization Leads to Feelings about Gender Discrimination and Safety

Gabrielle Hamel

Faculty Advisor: Kathryn Frazier, Ph.D.

Funding Sources: Worcester State Foundation Student Research, Scholarship, and Creative Activity Grant; WSU Academic Affairs Faculty Scholarship/Creative Activity Grant; Worcester State Honors Program; Worcester State University Psychology Department
A Commonwealth Honors Project

The ways in which women are socialized as children and young adults has lasting effects on their views of the world and how they fit into it. This interview study focuses on how young women’s socialization leads to their views on safety and gender discrimination, finding that women are often vocal about their experiences with gender discrimination, and avoid talking about safety concerns.

Reducing Students’ Intuitions About Evolution Using Refutation

Kennedy Damoah

Faculty Advisor: Benjamin Jee, Ph.D.

This study examines the effectiveness of a refutational approach to teaching evolution. Participants received either refutational or non-refutational (control) instruction between pretest and posttest of evolutionary thinking. Participants who read the refutational passage are predicted to do better on the posttest task. Ultimately, the findings from this study could be applied to support science learning in other settings.

Impact of Sense of Belonging Through Perceived Support on College Students’ Level of Stress

Katrina Piangerelli, Emily Pepi, Thea Koutoulas

Faculty Advisor: Nicole Rosa, Ph.D.

This project explores the relationship between belonging, support, and stress. Previous research shows that belonging and support impact well-being. Using data from the Emerging Adulthood Measured at Multiple Institutions nationwide study, it is expected that college students with greater sense of belonging and support will have lower stress compared to non-college students. These findings will add to the understanding of factors impacting stress level.

The Impact of Mental Illness and Disability on Divorce Rates

Taylor Boufford, Grace Nemphos, Tiffany Guerrero

Faculty Advisor: Nicole Rosa, Ph.D.

This project explores the impact of mental illness and disability on divorce rates. Previous literature on this topic is inconclusive. Using data collected as part of the Midlife in the United States nationwide study of adulthood, it is expected that a significant relationship between mental illness, disability, and divorce will be found. These results will add to the understanding of how these factors impact divorce.

The Effects of Socioeconomic Status and Caregiving on Mental Health

Thayna Da Silva, Jessica Lloyd, Kianaliz Roman

Faculty Advisor: Nicole Rosa, Ph.D.

This project explores the relationship between caregiving, socioeconomic status, and mental health. Previous research shows that caregiving and low socioeconomic status individually impact mental health. Using data collected as part of the MIDUS nationwide study of adulthood, it is expected that the combined impact of these factors significantly affects mental health. These findings will add to the understanding of the stress that accompanies caregiving.

What Makes You Feel Like an Adult? Effects of Financial Status and Stress

Chelsea DeMayo, Kaitlyn Berkel, Samantha Daigneau

Faculty Advisor: Nicole Rosa, Ph.D.

This project explores the relationship between financial status, independence, and stress levels. Previous research shows financial status impacts stress and independence. Using data from the Emerging Adulthood Measured at Multiple Institutions nationwide study, it is expected that finances will impact stress and independence more in males than females. These findings will add to the knowledge of financial status, stress, and independence.

Racial Disparities in Sentencing Recommendations for Middle Eastern Defendants

Nicholas Moore

Faculty Advisors: Seth Surgan, Ph.D., Marc Wagoner, Ph.D.

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

This research attempts to explain racial disparities in sentencing recommendations for Middle Eastern defendants. The research investigates the differences in how participants justified their sentencing recommendation for White vs. Middle Eastern defendants, as well as whether psychological phenomena such as white guilt, white privilege, and racial ambivalence impacted their reasoning.

Are You Ready? Differences in College Expectations and Readiness Between First-Year and Final-Year Students

Corrinne Lombardi, Bonnie Kanner, Ph.D.

Faculty Advisor: Nicole Rosa, Ph.D.

This project explores differences between first- and final-year students regarding college expectations and readiness. Data was collected in first-year seminar and capstone courses at the beginning and end of the semester. Findings indicate that the first-year student expectations and readiness changed across several dimensions over the course of the semester and more closely mirrored those of final-year students by the end of the first semester of college.

The Impact of Classroom Tools on Students' Note-Taking and Learning Outcomes

Kaitlynn Bishop

Faculty Advisor: Emily Soltano, Ph.D.

It is a challenge for students to reflect on their learning and comprehension. Discrepancies between what students think they know and what they retain is more apparent for students who struggle academically. Past research showed lecture outlines enhance learning, particularly for these students. The current study shows student achievement and type of lecture outline produced varied note-taking, which led to comprehension differences and had implications for classroom learning.

SOCIOLOGY
Engagements, Encounters, and Experiences with Diversity at Worcester State**

Stephanie McGrath, Courtney Garrahan, Cali Hetherman, Kacie Huntley, Manasseh Konadu, Jenna Letizia, Tavian Miranda, Anders Svendsen

Faculty Advisor: Alex Briesacher, Ph.D.

This research seeks to report preliminary results of a triangulated research project on diversity and inclusion at Worcester State University. Through a content analysis of WSU's official Twitter feed, qualitative interviews of current student experiences, and a survey of perceptions of individual experiences of campus climate, this work seeks to assess the campus climate surrounding issues of sex, gender, sexual orientation, race, and ethnicity, and students with disabilities.

Accessibility, Public Space, and Environmental Justice: The Fight for Inclusion and Equality Across Massachusetts

Lindsey Tarbox

Faculty Advisor: Francisco Vivoni, Ph.D.

A Commonwealth Honors Project

People with disabilities face struggles tied to deep social inequalities. This project exposes both the failures of the Americans with Disabilities Act (ADA) and the continued dominance of able-bodied people seen through the construction of built environments. Through observations, interviews, and quantitative data, this research forwards an environmental justice framework that exceeds the legal parameters of the ADA and challenges the dichotomy of normal/abnormal.

The Global City Standard: A Struggle for Belonging in Worcester, Mass. **

Colin Houle

Faculty Advisor: Francisco Vivoni, Ph.D.

The purpose of this research project is to define the term "global city" and how the city of Worcester, Mass., fits into that definition by observing what life is like for the working class, specifically with the immigrant population. As the term "global city" is defined, Worcester policy and projects will be analyzed and compared with other global cities with consideration to the perspective of working-class citizens.

Kink, Consent, and the College Experience**

Erica Gilman

Faculty Advisor: Alex Briesacher, Ph.D.

One's sexuality is perceived in a variety of different ways by both individuals and society. This project looks at the way people interpret their own sexuality in terms of kink, consent, and attitudes related to sexual transmitted infection (STI) and non-normative sexual behavior.

The Complex Asian American Experience: People of Color or People of Privilege? **

Mendrick Banzuela

Faculty Advisor: Alex Briesacher, Ph.D.

The "model minority" concept has become prevalent in the United States. *Crazy Rich Asians* and the rise of K-pop have only contributed to perceptions of Asians as pale-skinned, highly talented, wealthy "beauties." How do Asian Americans view such representations? Using 15 interviews from WSU students who self-identify as Asian, their views of the model minority myth, as well as their experiences of stereotyping and the impacts on Asians and other minorities, are analyzed. The complexity of Asian identity in relation to this myth will be examined toward creating a method for properly identifying minority groups.

Dating Apps and Their Latent Functions

Anders Svendsen

Faculty Advisor: Alex Briesacher, Ph.D.

This research explores mobile dating apps and whether people use them for dating or for other uses such as sexual encounters. Research is based on a survey drawn from the population of Worcester State University.

Our Local Bodega: The Impact of Franchise Dollar Stores on Urban Communities**

Shannon Goldberg

Faculty Advisor: Kevin Kane, MPIA

Examining growth in the number of dollar stores reveals a disturbing trend. Dollar stores are saturating low-income communities and threatening local family-operated bodegas. Concentrating field study and collaborating on Community Based Research-archived CityLab interviews with Worcester's immigrant entrepreneurs offer broad insights into comparative costs and benefits of dollar stores and their impacts on local bodega businesses.

URBAN STUDIES

Urban Study of Burncoat Block

Alisha Papadakis

Faculty Advisor: Adam Saltsman, Ph.D.

Within Worcester there are many different neighborhoods. Each has unique features, but collectively they create the reputation of the city. Even the individual blocks within the city add to its key features. This project's goal is to analyze a block in the Burncoat neighborhood and compare it to the city as a whole. This block represents the city well because it has a country club, a church, apartments that participate in a rental assistance program, and other multi-family homes all within its borders.

Urban Features of Shrewsbury Street

Emma Gosselin

Faculty Advisor: Adam Saltsman, Ph.D.

The urban environment of Worcester, Mass., varies greatly depending upon which area of the city is surveyed. This project's goal was to identify one block of the Shrewsbury Street neighborhood in Worcester to analyze and compare it through a residential, social, and commercial lens with other areas of the same neighborhood. Results indicate that blocks within a neighborhood vary greatly; however, they still contribute to the community functioning positively.

Hungry for Knowledge? Assessing Stigmas and Information Students Have Surrounding Hunger Supplementation Programs

Simone Dufresne

Faculty Advisor: Adam Saltsman, Ph.D.

A Commonwealth Honors Project

Attempts to address college students' food insecurity are being made, but this is difficult to do when students conceal their struggles. Worcester State University's Supplemental Nutrition Assistance Program, and Thea's Pantry could help students supplement food and money for bills and groceries, yet most students neglect these resources. An online survey sent to all WSU students will determine how students at WSU perceive the Supplemental Nutrition Assistance Program and Thea's Pantry and suggest ways to reduce the stigma surrounding supplemental nutrition.

What One Block Means for Worcester

Rebecca Carrillo

Faculty Advisor: Adam Saltsman, Ph.D.

A Commonwealth Honors Project

For years, Worcester has been thought of as a run-down city with not much vibrancy for the ones who live inside its boundaries; however, a closer look at the city proves that stereotypes aren't always accurate. By studying the characteristics of one block in Worcester in what is known by many as the worst neighborhood of it, this poster, based off of mapping, reflects what is actually true about this life in the block, and what that shows about Worcester.

VISUAL AND PERFORMING ARTS

Ingenuity Opportunity

Bailey Boutiette

Faculty Advisor: Catherine Wilcox-Titus, Ph.D.

Cultural institutions are critical for a creative economy to successfully contribute to urban renewal, especially in formerly industrialized mill towns like Worcester. Exhibitions, like Ingenuity Opportunity in our campus gallery, inspire innovation and growth. Drawing upon my second major in business administration, my research summarizes the role of cultural institutions and their ability to transform communities through the celebration of fresh ideas.

WORLD LANGUAGES

Journalism in Nazi Germany**

Aidan DuPont

Faculty Advisor: Jeanne Moore, Ph.D.

The presentation focuses on journalism in Nazi Germany. It will highlight the way in which Hitler gained control over the German press by arresting those working for Jewish newspaper companies and infiltrating German newspaper companies to make them pro-Nazi. The presentation will also consider resistance group-published newspapers, and how foreign correspondents reported about and, in some cases, worked against the Nazi regime.

The Nuremberg Trials

Jonathan Mariano

Faculty Advisor: Jeanne Moore, Ph.D.

The Nuremberg trials were a series of military tribunals held by the Allied forces under international law and the laws of war after World War II. A brief list of the convicted are: Hermann Göring, Rudolf Hess, and Alfred Jodl. I will be doing a poster board on the Nuremberg trials as a criminal justice major and point out key details on where they took place, when, and what were the aftermath and results of the trials.

Disabilities in Nazi Germany**

Erin Haggerty

Faculty Advisor: Jeanne Moore, Ph.D.

Funding Source: World Language Department

This project is a short fictional story based in Nazi Germany. The story follows a woman who has been forced to hide out in an attic to avoid the horrible fate that many Jewish people were forced to accept in the 1940s. The struggles that she faces while living alone with her newborn son and the fear she holds in her are seen throughout this story. The terror and fear felt by many Jewish people during this time period is brought to life through the fictional story of Miriam Bergstein.

Hitler Detained**

Robbie Tucci

Faculty Advisor: Jeanne Moore, Ph.D.

This project is a short story exploring the world of Adolf Hitler at its center. It focuses on his manipulative but exotic methods. The story is a study of the mind of a detained Hitler. The main focus is on two questions: (1) What were the reasons for his ways? and (2) Could there have been a different future?

German Propaganda**

Derek Wood

Faculty Advisor: Jeanne Moore, Ph.D.

World War II began at the same time as the advent of modern-day media. This project will examine the means, methods, and uses of both German and U.S. propaganda, from a film-making perspective.

Celebration of Scholarship and Creativity

Departmental Liaisons

Biology.....	Steven Oliver
Business Administration and Economics.....	Jay Mahoney
Chemistry.....	Brian Xu
Communication.....	Dan Hunt
Communication Sciences and Disorders.....	Susanna Meyer
Computer Science.....	Elena Braynova
Criminal Justice.....	Hyesun Kim
Earth, Environment, and Physics.....	William Hansen
Education.....	Sue Foo
English.....	Cleve Wiese
Health Sciences.....	Mariana Calle
History and Political Science.....	Alison Okuda
Mathematics.....	Hansun To
Nursing.....	Amanda Cornine
Occupational Therapy.....	Joanne Gallagher Worthley
Philosophy.....	Frank Boardman
Psychology.....	Jacquelyn Raftery-Helmer
Sociology.....	Francisco Vivoni
Urban Studies.....	Timothy Murphy
Visual and Performing Arts.....	Catherine Wilcox-Titus
World Languages.....	Antonio Guijarro-Donadiós



Celebration of Scholarship and Creativity Event Contributors

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