

APRIL 13, 2016

Celebration of Scholarship & Creativity



WORCESTER
STATE
UNIVERSITY

SCHEDULE OF EVENTS

April 13, 2016

POSTER SESSION

3–5 p.m.

Student and Faculty Presentations

May Street Building, Auditorium

ORAL PRESENTATION AND PANEL DISCUSSION SCHEDULE

FOSTER ROOM

10–10:30 a.m.

Density Functional Theory Computation of the Individual Stabilization Energy Contributions of Individual Hydrogen Bonding Interactions in the Guanine Tetramer Chemistry

Tyler Clausen, Katelyn Rioux, Stephen Simeone

Faculty Advisors: Eihab Jaber, Ph.D., Jeffrey Nichols, Ph.D.

Student Center, Foster Room

10:45–11:15 a.m.

Robbed of Choice: The Commercial Sexual Exploitation of Children in the United States of America

Emily L. White

Faculty Advisor: Thomas Conroy, Ph.D.

Student Center, Foster Room

11:30 a.m.–12 noon

Comparison of Dietary Intake and Athletic Profiles with Sports Performance in Middle-age Competitive Recreational Athletes

Melissa Fuentes, Olivia Guilmette, Richard Johnson

Faculty Advisors: Mariana Calle, Ph.D., M.S., RD, LDN,

Matthew Kostek, Ph.D., CSCS, ACSM-EP-C

Student Center, Foster Room

12:15–12:45 p.m.

Black Mountain College: 20th-Century Experiment, 21st-Century Resonance

Pamella Saffer

Faculty Advisors: Lisa Kramer, Kyle Martin, Catherine Wilcox-Titus, Ph.D.

Student Center, Foster Room

1–1:30 p.m.

Internships at the Worcester Art Museum: A Collaborative Project of Visual and Performing Arts and Communication

Ryan Jarvis

Faculty Advisors: Julian Berrian, Catherine Wilcox-Titus, Ph.D.

Student Center, Foster Room

1:45–2:15 p.m.

The Marvelous Dissection of the [hu]Man

Kristine MacBrian

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

Student Center, Foster Room

FALLON ROOM

10–10:30 a.m.

The Goodbyemoon: A Memoir of Loss

Amy Angell

Faculty Advisor: Elizabeth Bidinger, Ph.D.

Student Center, Fallon Room

10:45–11:15 a.m.

The New Worcester Spy: Recent Projects and Developments

Nicholas Clark, Madison Friend, Noah Goldfarb, Timothy Jarvis, Jennifer Johnson

Faculty Advisor: Hugh Wiese, Ph.D.

Student Center, Fallon Room

11:30 a.m.–12 noon

Compositions by WSU Students

Spring 2016 Composition Course Students

Faculty Advisor: Kyle Martin

Student Center, Fallon Room

12:15–12:45 p.m.

Dr. Him, Dr. Her, Dr. Who?

Aimee Thorsen

Faculty Advisor: Julie Frechette, Ph.D.

Student Center, Fallon Room

1–1:30 p.m.

Theme Semester Recognition Celebration and Spring 2017 Theme Announcement

Sam O'Connell

Student Center, Fallon Room

1:45–2:15 p.m.

AVID: Creating the School to College Pipeline

Katherine Bunker, Scott Freniere, Daniel Livermore,

Michael Lyons, Kathryn Bettley, M.A., Sara Young Ed.D.

Faculty Advisors: Kathryn Bettley, M.A., Sara Young Ed.D.

Student Center, Fallon Room

2:30–3 p.m.

The Emergent Paradigm

Olivia Gyedimin

Faculty Advisor: Carlos Fontes, Ph.D.

Student Center, Fallon Room

Celebration of Scholarship and Creativity

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

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

Study Abroad in the Dominican Republic: Intersection of Environmental Protection and Extreme Poverty

Alexis Anderkin

Faculty Advisor: Sebastian Velez, Ph.D.

The BI401 Selected Topics course includes a 10-day study abroad trip to the Dominican Republic, which is an intensive four-credit biology lab course. The purpose of this trip was to study the intersection of environmental protection and poverty through the experience of living temporarily in a third-world country. We observed Haitian sharecroppers who are often bound by contracts and cannot escape the harsh labor conditions they endure. It is not uncommon that many people in the area are treated unfairly, but they seem to have no other choices for employment. Local non-government organizations (NGOs) are working to ease suffering, but are not effectively helping. I intend to share my experiences from my travel to the Dominican Republic and what I've learned from historical readings, hiking, and my interactions with community members to determine why these problems are so prevalent.

Investigation of the Effect of Bud3 Phosphorylation Site Mutations on Cell Cycle Progression in the Yeast *Saccharomyces cerevisiae*

Alexis Anderkin, Christian Grant, Jennifer Hood-DeGrenier, Ph.D.

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

In the budding yeast *Saccharomyces cerevisiae*, the protein Bud3 has been shown to have important functions in cell cycle regulation, specifically in the late stages of mitosis, mitotic exit, and cytokinesis. In addition to these functions, Bud3 also localizes at the mother-bud neck, the site of cell division, and is responsible for bud site selection. Bud3 is phosphorylated by cyclin-dependent kinase at several sites. Mutations that affect this phosphorylation have previously been shown to cause mild defects in bud site selection. In this study, we observed the effects of Bud3 phosphorylation site mutants on cell cycle progression. Yeast cells expressing a Bud3 mutant mimicking constitutive phosphorylation and a non-phosphorylatable mutant were subjected to synchronized cell assays and observed by microscopy to identify cell cycle progression defects.

Developing a Conservation Strategy for Migrating Lepidoptera by Addressing Habitat Dominated by Invasive Species at Broad Meadow Brook Sanctuary

Olivia Burnham

Faculty Advisor: Randall Tracy, Ph.D.

The order *Lepidoptera* includes butterflies and moths. Several species of each suborder migrate seasonally, which can take up to four generations to complete. These insects require plentiful stopover habitats: areas where migrating animals rest, eat, and breed. The stopover habitats for these insects are threatened by *Phragmites australis*, an invasive species of reed that outcompetes wildflowers that are key resources for *Lepidoptera*. Eradicating *Phragmites* and encouraging wildflowers in areas of invasion could significantly improve the observed number of *Lepidoptera* over several years. These insects have immeasurable value as pollinators and should be protected for their biodiversity. In this study, I directly and indirectly tested the effect of *Phragmites australis* on pollinator biodiversity at Broad Meadow Brook Sanctuary in Worcester.

Comparison of the Weight and Length of *Pseudemys rubriventris* Raised at Worcester State to Those in the Wild

Ashley Emery, Ashley Landry, Nirvana Filoramo, Ph.D.

Faculty Advisor: Nirvana Filoramo, Ph.D.

The Northern Red-Bellied Cooter (*Pseudemys rubriventris*) is a near-threatened species of turtle whose habitat includes areas along the Massachusetts shoreline. In response to their declining population, the Massachusetts Division of Fisheries and Wildlife implemented a conservation program. Hatchlings were collected and distributed to various institutions to be raised; those given to Worcester State were received on October 6, 2015, and will be released in the spring of 2016. Our juvenile turtles were fed a diet of romaine and red lettuces along with small amounts of the commercial turtle food Reptomin. Once a week, the mass of each turtle was recorded in grams and carapace length in millimeters. By comparing these measures to those of turtles in the wild, the current success of our program can be evaluated and used to determine what changes can be made so that the released turtles have a better chance of surviving and producing offspring.

Monitoring and Identifying Members of the Soil Microbiota in Worcester-Area Parks

Nidhee Krishnan

Faculty Advisor: Roger S. Greenwell, Ph.D.*Funding Source:* Student Research, Scholarship, and Creative Activity Grant

The hygiene hypothesis attributes the marked increase observed in immune dysregulation (increased allergy and asthma rates) to reduced interactions between children and the natural environment. Lack of exposure to soil microorganisms via reduced outdoor activities or the creation of virtually sterile indoor environments can lead to children being unable to develop a sufficient immune system. Reducing the prevalence of allergic sensitization includes efforts to promote healthy habits such as outdoor play. This project is part of the WSU Community Health Improvement Plan (WSU CHIPs in Action) focused on primary health and wellness of the residents of Central Massachusetts. Our goal is to characterize the microbial consortia present in the soils of the five popular Worcester parks by establishing a microbial library and a metagenomic database of the microbes present to monitor the microbial population changes over time and identify the microbial composition of the soils in which the children of Worcester play.

Inhibition of IFIH1 in *Xenopus laevis* Stage VI Oocytes^{}**

Brittany Spaziente, Daron Barnard, Ph.D.

Faculty Advisor: Daron Barnard, Ph.D.*Funded Source:* Student Research, Scholarship, and Creative Activity Grant

The significance behind 2'-O-methylation of mRNA prior to translation remains unclear. *Xenopus laevis* stage VI oocytes pause developmental transcription during prophase of meiosis I. Gene expression is regulated by activating and inactivating translation of certain mRNAs via polyadenylation. The polyadenylation and translation of the c-mos mRNA stimulates oocyte re-entry into meiotic division. It has been shown that inhibiting cap-ribose methylation uncouples polyadenylation from translation. The IFIH1 gene is known to identify and bind viral mRNAs based on 2'-O-methylation state to differentiate between self and non-self-constituents and controls expression of innate-immune response related genes. Interestingly, IFIH1 mRNA is found in stage VI oocytes. By inhibiting the IFIH1 gene in *Xenopus* stage VI oocytes with PIV5 V-protein, a known inhibitor of IFIH1, we seek to understand further the IFIH1 gene's role in detecting or controlling this methylation and how this methylation is related to oocyte maturation and development.

***Xenopus laevis* and the IFIH1 Gene: Cloning the IFIH1 Gene**

Diego J. Urbina

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

The gene for the protein interferon induced with helicase C domain (IFIH1), has been found in many vertebrate species as an anti-viral mechanism, but it is also considered to be a key regulatory gene in other applications. One possibility is the role of the IFIH1 gene as the regulatory system in the silencing and activation of mRNA, in the *Xenopus laevis* oocyte, before maturation, which uses mRNA modification for gene regulation instead of mRNA synthesis. The role that my research has focused on has been in the cloning of the IFIH1 gene via a plasmid vector, in order to have enough genetic material to sequence the gene. The IFIH1 gene has been confirmed to be in the oocyte, and through RT-PCR enough genetic material has been obtained for cloning. Currently an attempt is underway to ligate the IFIH1 gene with the pCS2P+ plasmid for transformation and sequencing.

BIOTECHNOLOGY**Parsnip Plants (*Pastinaca sativa*) and Carrot Plants (*Daucus carota*) Can Regenerate from Cultured Callus Cells in Mixed Co-Cultures**

Michael Caron, Natalie Marchi, Peter Bradley, Ph.D.

Faculty Advisor: Peter Bradley, Ph.D.

Plant tissue culture techniques are used to culture plant cells in the lab. The presence or absence of plant hormones in the medium can induce regeneration of embryos, shoots, and roots from callus cells. In this study, carrot cells were cultured on B5 agar medium containing the auxin "2,4-D". Transfer to a medium lacking 2,4-D induced the formation of carrot shoots and roots. Various different hormone combinations were tried to

regenerate the parsnip plants (*Pastinaca sativa*), but the formation of their shoots was more difficult than with carrot cultures. Parsnip plants were finally regenerated from a mixed culture where plants were also regenerating from carrot cells at the same time. Shoots from parsnip and carrot (*Daucus carota*) were recognized by the appearance of the leaves. This preliminary study suggests a co-culture method to regenerate shoots from parsnip callus that does not rely on treatments with the usual plant hormones.

Mutagenesis of Oleaginous Bacterial and Fungal Species for the Development of Biofuels*

Terren Flanders

Faculty Advisor: Roger S. Greenwell, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

While nature provides the compounds necessary to make fossil fuel, there is not yet an effective replacement. The best candidates for future fuel sources are biofuels. Some effective biofuels have also been developed, from plant, animal, bacterial, or fungal sources; however, commercially available biofuels are only available as fuel additives. The goal of this project is to develop a collection of mutant microbial strains with enhanced lipid- or carotenoid-yielding properties for a next generation biofuel. We have treated oleaginous (oil-rich) bacterial species (*Streptomyces hygroscopicus* and *Streptomyces griseus*) and the fungus *Aureobasidium pullulans* with mutagens (EMS or UV mutagenesis) to increase their lipid production, particularly under varying carbon:nitrogen (C:N) ratios. Our goal is to engineer strains to utilize a variety of food stocks, either individually or in co-cultures, and produce increased levels of compounds that can act as biofuels.

Effectors of the *Streptomyces coelicolor* Life Cycle Transition to Aerial Hyphae

Joseph Girouard

Faculty Advisor: Roger S. Greenwell, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

The bacterium *Streptomyces coelicolor* is known for antibiotic production and its complex developmental life cycle. We are investigating pathways necessary for morphogenesis of this filamentous bacterium, focusing on its transition from vegetative to aerial hyphae (AH). Our work focuses on the biosynthesis of the biosurfactant SapB and the secretion of compounds that allow bypass of developmentally-defective strains. SapB allows cells to break aqueous surface tension and transition to AH. SapB production is controlled by the response regulator, RamR, but the activation mechanism for RamR remains unclear. Variant RamR proteins are being investigated in vivo to identify essential components of this regulator. Developmentally-defective *S.coelicolor* mutants in which AH do not form are being investigated to identify the developmental signals necessary for AH formation. Some secreted extracellular signals can bypass these defects, such as BldF-secreting compounds that allow other strains to form AH. We are using chromatography methods to separate these compounds for identification. These experiments will allow us to understand further the developmental processes of *S. coelicolor*.

Analysis of Differences Among Various Fish Muscle Proteins

William Rodriguez, Ellen Fynan, Ph.D.

Faculty Advisor: Ellen Fynan, Ph.D.

The purpose of this study is to analyze structural differences among the muscle protein, known as myosin, of several fish species, and to correlate these differences with the size of the habitat in which the fish were grown. This study is an expansion of previous work started by students of WSU's Biology Department on the myosin proteins of both farm-raised and wild salmon. Following similar methods, the myosin proteins of several fish were isolated, electrophoresed, and western blotted to visualize and quantify the size and, subsequently, the structural differences of the myosin light chain proteins among fish species and their wild counterparts. These variations in myosin structure may serve as indicators of the kind of habitat in which the fish developed—that is, whether they were born in the wild or in captivity. Further analysis may be conducted in order to determine the specificity of these variations in myosin structure and what effects they may have on the organisms as a whole.

Phenotypic and Biochemical Effects of Altering the Phosphorylation State of the Bni4 Protein in the Budding Yeast *Saccharomyces cerevisiae**

Cheryl Smith

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

The *Saccharomyces cerevisiae* (budding yeast) protein, Bni4, plays a role in forming the yeast cell wall during cell division. Bni4 has been shown to undergo phosphorylation, a common biochemical modification that affects the function of a protein. I am investigating the phenotypic and biochemical effects of altering the phosphorylation state of Bni4 through mutation of the gene that encodes Bni4 and manipulation of a regulatory protein involved in its phosphorylation. I expect to find significant differences in the morphology and cell cycle progression of cells that express Bni4 mutated to mimic a consistent phosphorylated state as compared to wild-type and those that are mutated to mimic a consistent de-phosphorylated state. This work is significant because abnormal protein phosphorylation is frequent in cancer cells and the cell wall represents a key target for anti-fungal drug development.

BUSINESS ADMINISTRATION AND ECONOMICS

Trew Friends Expansion**

Sofia Alberini, Breanna Hobbs, Lindsay Hunter, Rebecca Jacobs, Julie Lefebvre, Jemini Patel

Faculty Advisor: Jay Mahoney, Ph.D.

A Commonwealth Honors Project

Currently, more than 124,000 people are on the waitlist for a transplant and 21 people die every day waiting for one. One donor has the potential to save up to eight lives. Trew Friends is a student-run community dedicated to spreading awareness of the importance of organ, eye, and tissue donation. Our goal is to increase our chapter presence on college and university campuses in the Northeast. We created a targeted mailing list based upon specific criteria: Enactus affiliation, secular relationships, and size. Our team then tailored the materials to appeal to and/or meet the needs of those institutions. The next step was to design a follow-up with useful information on how to implement a Trew Friends chapter. Our team reached out to 84 colleges, with 14 expressing interest and two starting the initial phases of creating a chapter. We will follow through with the remaining colleges until chapters are established.

The Politico-Economic Zoo: Presidential Parties and Their Effect on Stock Market Index Performance

Drew Case

Faculty Advisor: William F. O'Brien, Jr.

A Commonwealth Honors Project

This study investigates the relationship between presidential political parties and stock market performance in a data set consisting of two major indexes (Dow Jones Industrial Average and S&P 500) over the period 1961-2012. Previous research has observed that stock market returns seem to be affected by economic policy originating in Washington. As such, the goal of this study is to examine whether market performance is greater or less robust under different party tenures. Several political, macroeconomic, and financial independent variables are utilized in regression analysis, with the dependent variable being the log of the index year-end closing value, taken on the last trading day of the year and adjusted for inflation using 2012 dollars. The analysis will reveal not only whether the markets tend to prefer Democratic or Republican tenures, but also how significant of an impact a presidential political party in power may have on index returns.

Reyes House Access to Health Care**

Brittany Clark, Brittany Desilets, Megan Foley, Sarah Khallady, Rachel Little

Faculty Advisor: Jay Mahoney, Ph.D.

Funding Source: The Fairlawn Foundation Fund at Greater Worcester Community Foundation, The Health Foundation of Central Massachusetts

A Commonwealth Honors Project

Access to Health Care began as a WSU Worcester Community Health Improvement Plan internship. We sought to identify resources available to those struggling with substance abuse or mental health, compiled a comprehensive database, and engaged in an extensive verification process. Phone calls and visits were made to service providers.

Waitlists were months long, only one or no Spanish-speaking clinicians were available, and even a doctor making referrals was waitlisted. The results proved those most in need faced countless hurdles while seeking help. We updated and noted a current directory of service, then made it available to the community. Another value-added deliverable was a student-developed and student-taught module for Reyes House. The clients learned basic insurance concepts, such as how to choose a primary care physician and how to access different forms of care. The residents need this information to be self-sufficient and remain sober. With this knowledge, the clients are empowered to begin their new lives.

Café Reyes Marketing Venture

Kathleen Covenor, Nicole Gomes, Tiffany Marquez, Amber Suarez, Sarah Weston, Alyssa Yacovone

Faculty Advisor: Jay Mahoney, Ph.D.

Café Reyes is a social-entrepreneurial venture launched by the Latin American Health Alliance (LAHA) that provides Latino men with entry to the workplace. Our mission was to design and attract new, younger clientele to the café. We designed “Fiesta Fridays” to be bi-weekly events from February to April. Working closely with the café’s management, we designed specific marketing campaigns for each event, listed an attractive food-inclusive entry price, and secured professional services. Our team employed an entrepreneurial approach and created a PERT chart, performed a break-even analysis, and advertised extensively on social media. We designed metrics to compare pre- and post-revenues, attendance numbers, satisfaction/intent to return surveys, and LAHA awareness information. This data will be available and presented at the celebration. The Enactus Team members gained excellent operational skills through this project and the wonderful food at Café Reyes created a new customer audience.

CHEMISTRY

Phthalates in Nail Polish

Tatiana Buchanan

Faculty Advisor: Meghna Dilip, Ph.D.

Phthalates are a class of chemical compounds generally used to make plastics more pliable. The beauty industry also uses phthalates in products such as shampoos, lubricating oils, hair sprays, and nail polish. The use of phthalates in common materials generates widespread exposure to the population, and studies have shown phthalates to be present in human breastmilk as well as urine. In this project, phthalates are being investigated as possible endocrine disruptors. Research conducted analyzed the presence of phthalates in various nail polishes using a liquid chromatography/mass spectrometry (LC/MS) technique. Relationships between the quantity of phthalates and characteristics of the nail polish, such as color and brand, were determined.

Computational Investigation of Reaction Mechanism of HNO with Thiols

Tadas Buivydas, Endrit Theodhori

Faculty Advisors: Susan Mitroka, Ph.D., Joseph Quattrucci, Ph.D.

Nitroxyl (HNO) is a highly reactive endogenous nitrogen compound. The high reactivity and its electrophilic nature make it a strong candidate for reducing nucleophilic thiols. The thiophilic nature of HNO has the potential for enzymatic inactivation leading to protein modification. Given the strong affinity of HNO towards electrophilic thiols, it is expected that the more electropositive selenothiols will have a faster reaction rate compared to the sulfur-containing thiols. Transition state conformations were determined at the B3LYP/6-31G (d,p) level of theory. Intrinsic reaction coordinate calculations confirmed the reaction mechanism leading to the desired N-hydroxysulfenamide product and its reversibility. Activation energies and rate constants showed that selenothiols have a lower energetic barrier and a faster rate constant. To determine the kinetics under physiological conditions, molecular mechanics calculations regarding the reactivity of selenothiols and thiols reacting with nitroxyl are currently being carried out and interpreted; however, these results are in their early stages.

Hydrogen Storage in Metal-Decorated Graphene Systems

Neil P. Chapin

Faculty Advisor: Joseph G. Quattrucci, Ph.D.

Studies for alternative energy other than fossil fuels have been a pressing objective. Hydrogen storage as a renewable and high-yielding energy source has become a well-studied problem in recent years. Ways to store hydrogen have presented problems and several options have been explored. It is important to understand the dynamics of the hydrogen dissociative chemisorption process. To do this, a potential energy surface is required. In this investigation, we examined the two-body interactions of atomic hydrogen with a Ni-decorated graphene surface. In addition, results from our three-body interaction of molecular hydrogen with the Ni-graphene surface are presented. Density function theory calculations were performed to study these interactions. Preliminary results of atomic hydrogen's interaction with graphene yield an adsorbed bond length of 1.567 Å and dissociation energy of 3.109 eV.

Introducing Instrumental Analysis of Forensic Evidence at Worcester State University

Neil P. Chapin, Francini Fonseca

Faculty Advisor: Anne Falke, Ph.D.*Funding Source:* WSU Faculty Mini-Grant

Forensic science is a promising field that deals with criminal investigations by searching and analyzing evidence to be used in a court of law. This project aims to facilitate the development of a sophomore-level forensic analysis course at WSU. It involves testing and creating four laboratory protocols. The experiments to be developed for the course will focus on the analysis of gunshot residue (GSR), handwriting, explosives, and the investigation of alcohol in blood samples. The addition of the course and the forensic science minor is beneficial because it could supplement a science or criminal justice major.

Density Functional Theory Computation of the Individual Stabilization Energy Contributions of Individual Hydrogen Bonding Interactions in the Guanine Tetramer**

Tyler Clausen, Katelyn Rioux, Stephen Simeone

Faculty Advisors: Eihab Jaber, Ph.D., Jeffry Nichols, Ph.D.*Funding Source:* Student Research, Scholarship, and Creative Activity Grant

Telomeres, or the terminal structures of chromosomes which mitigate the loss of genetic information during DNA replication, are composed of guanine (G)-rich sequences. These sequences form G-tetramer complexes in vivo that are stabilized by eight G-G hydrogen bonds and ligand bonds to a central cation. While previous investigations utilizing either density functional theory or ab initio approaches have provided insight into the interactions that contribute to G-complex stability, they have failed to identify the contributions of the individual bonds within the complex. We present a novel computational methodology that has facilitated the characterization of each individual hydrogen bond's energy contribution to the complex's stability when the cation stabilized. We conclude that the internal and external hydrogen bond energies contribute disproportionately to complex stability and vary dependent on cation identity and its distance above the complex plane. Our methodology will next be utilized to elucidate the formation dynamics of G-tetramers.

Nitroxyl Reactions with Selenoproteins: A Novel Approach to Cancer Therapy**

Edward Dressler, Rachael Messier, Susan Mitroka, Ph.D.

Faculty Advisor: Susan Mitroka, Ph.D.*Funding Source:* WSU Faculty Mini-Grant

Nitroxyl (HNO) reacts as a potent electrophile and rapidly forms addition products with nucleophiles. Its chemical reactivity has made it a promising therapeutic agent, specifically in its ability to inhibit proteins containing a cysteine (thiol) active site. While the reactions of thiols and HNO have received much attention, little is known about the reactions of selenium-based compounds and HNO. TrxR is a seleno-enzyme known to be involved in many cellular regulatory processes, including anti-oxidant defense of the cell, cellular repairs, and cell proliferation. Of particular interest in cancer chemistry is the role these enzymes play in preventing apoptosis. Several TrxR inhibitors are currently being tested as possible cancer therapeutics, either via inducing apoptosis in a cancerous cell line or reducing the resistance to other chemotherapeutic drugs. In this research, we examine the ability of HNO to inhibit TrxR1 activity.

Estrogen in the Blackstone River and its Effect on Tadpole Development⁺⁺

Francini Fonseca

Faculty Advisors: Daron Barnard, Ph.D., Kathleen Murphy, Ph.D.

Funding Source: WSU Faculty Mini-Grant

Recent studies have shown that estrogen present in surface water, even at parts per trillion levels (ng/L), can have an adverse effect on the development of aquatic species. This past year, water and soil samples taken from the Blackstone River were analyzed for the presence of 17 β -estradiol, also known as E2. This is the predominant and most potent form of natural estrogen excreted by humans and animals. The water samples collected had similar E2 values compared to water samples collected the previous year; however, the soil analysis method had to be modified due to matrix background interference. Lab results are pending to support this new method. The second component of this study is to investigate the effect of the presence of E2 in water by observing *Xenopus* tadpole development. Future work will include re-sampling and analyzing river soil using the modified method and investigating the levels of EE2, the synthetic version of E2 that is prescribed for birth control and hormone therapy.

DFT Study of the Dissociation of Molecular Hydrogen over Nickel-Decorated Graphene

Alexander Zielinski

Faculty Advisor: Joseph G. Quattrucci, Ph.D.

The everyday use of hydrogen as a green source of energy is restricted by available hydrogen storage methods. The storage of hydrogen on graphitic materials, such as carbon-nanotubes, has been proposed as a viable means to store hydrogen. In this study, we have investigated the minimum energy path for the dissociation of molecular hydrogen over a nickel-decorated graphene sheet. Our preliminary calculations show that there is an attractive interaction between the hydrogen molecule and the Ni/graphene surface as hydrogen approaches over the Ni. The dissociative chemisorption process was determined to be endothermic by approximately 0.5 eV, with an activation energy of approximately 3 eV. Our findings are comparable to those performed by other researchers.

COMMUNICATION

Gender & Sexuality Roles Through Women in Sports & Media

Marissa Avanzato

Faculty Advisor: Julie Frechette, Ph.D.

The roles of gender and sexuality related to women in sports have made an impact on mass media today. Title IX states, "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Title IX calls for the equal treatment and representation of males and females among their participation, scholarships, and benefits in sports. This presentation will critically analyze how the passage of Title IX through college athletics has changed over the years.

The Emergent Paradigm^{**}**

Olivia Gyedimin

Faculty Advisor: Carlos Fontes, Ph.D.

This presentation will argue that a new social paradigm is emerging out of the current global crisis, and that cutting-edge science, indigenous voices, spiritual politics, and the "bioneer" movement are driving the development of the worldview underlying the emergent paradigm. The presentation will also discuss the various ways in which this new paradigm is being expressed in new models of food production, economic activity, and social organization.

Creating a Strategic Media Plan for a New England Amusement Park

Vanessa O'Donnell

Faculty Advisor: Emanuel Nneji, Ph.D.

The goal of this project is to raise customer awareness, change consumer attitudes, and increase park attendance for a New England amusement park. Canobie Lake Park opened its doors in 1902 to a variety of individuals, eventually evolving into the park that it is today. With its multitude of rides and natural beauty, the park is a place

that is inviting for everyone. This detailed plan uses a situation analysis to understand the company's place among its competitors. An evaluation of the target audience and the best ways to reach that audience is provided, as well as a strategic plan which will help aid Canobie Lake Park management in achieving their advertising and public relations objectives.

Dr. Him, Dr. Her, Dr. Who?*

Aimee Thorsen

Faculty Advisor: Julie Frechette, Ph.D.

Aliens, robots, and time travel! Oh my! If, like me, you are a fan of the legendary, longtime running television show *Doctor Who*, then you can envision the brilliance that is considered madness to most infrequent viewers. As dedicated fans of the show, we call ourselves "Whovians", meaning that we are a part of a community fandom. There are many concepts that may have intoxicated these Whovians into watching the show. For most of them, it is the concept of science fiction, where one meets colonies of species from multiple planets and galaxies by traveling through time and space. Many recent fans, however, have been attracted to another concept in the show, that being the Doctor himself. This clever, charming man captured the hearts of many women and men around the world. In this presentation, I wish to discuss the importance of gender roles in *Doctor Who*, and I will cover the evolution of the female roles portrayed both in the 1960s-1980s series as well as in today's newer, millennial series.

COMMUNICATION SCIENCES AND DISORDERS

Visual vs. Auditory Confrontation Naming in People with Aphasia

Jocelyn Hurst

Faculty Advisor: Sharon Antonucci, Ph.D.*Funding Sources:* WSU Faculty Mini-Grant 2014-2015, WSU Faculty Mini-Grant 2015-2016

A Commonwealth Honors Project

Aphasia, a language impairment commonly caused by stroke, results in deficits in language production and comprehension. People with aphasia exhibit difficulties in the concept of naming, which is verbally labeling objects or concepts. Naming abilities may differ depending on whether the input is visual or auditory. Data was collected from participants with stroke aphasia as well as from age and education matched controls. Participants were asked to complete two tasks. The visual confrontation naming task involved naming 30 living and 30 non-living objects following picture presentations. In the auditory confrontation naming task, participants were asked to name nine living and nine non-living objects following both a visual-perceptual and a functional-associative definition. Responses are being analyzed in order to determine whether participants performed better on one task or the other. An analysis of modality-specific deficits is important in order to determine what type of input can aid in the naming process.

Can the Hearing Handicap Inventory for the Elderly Predict Degree of Hearing Loss?

Ashley Lameiras

Faculty Advisor: Susanna Meyer, Ph.D.*Funding Source:* Student Research, Scholarship, and Creative Activity Grant

The aim of this study was to determine if the Hearing Handicap Inventory for the Elderly (HHI-E) predicted the degree of hearing loss in an individual. Nineteen individuals (age range 35-87) with a bilateral hearing loss (ranging from mild to profound) participated in this study. All participants completed the HHI-E and reported their degree of hearing loss. The results indicated that there was a poor relationship between self-reported degree of hearing loss and the degree of handicap on the HHI-E; however, the HHI-E predicted the social and emotional effects of the hearing loss well. In conclusion, the HHI-E did not correlate with the degree of hearing loss, but it correlated well with self-perceived emotional and social handicap. Individuals' perceptions of their hearing loss are unique because they cope individualistically with the social and emotional effects. This information is helpful in counseling clients.

Comparing Formal and Informal Measures of Stuttering Severity

Courtney Mullin

Faculty Advisor: Kenneth Melnick, Ph.D.

Funding Source: WSU Honors Program

A Commonwealth Honors Project

In most clinical settings, the Stuttering Severity Instrument for Children and Adults (SSI) is the test used to diagnose stuttering and measure its severity. The SSI-4 may be expensive for some to purchase, and it neither defines stuttering nor does it include a diagnosis of “no stuttering.” The informal measure, weighted stutter-like disfluency (weighted SLD), is freely accessible to certified speech-language pathologists (SLPs), does define stuttering, and includes a diagnosis of “no stuttering.” Clinical observation has suggested that both measures may result in similar diagnoses; however, formal study to determine whether this is true has not been done to this date. It is the purpose of this study to compare stuttering severity measures produced by the SSI and weighted SLD by using data from a relatively small (n=10) sample of young children. If both are found to yield similar results, it would suggest that SLPs could use the informal measure.

COMPUTER SCIENCE

New York City Employment 2014

Akwasi Agyemang, Saif Jweda

Faculty Advisor: Elena Braynova, Ph.D.

This project aimed to predict the employment status, income range, and borough where an individual will reside based on some demographic and financial information about people living in New York City. The NYC Employment 2014 data set used in this project contains 1,522 instances and 11 attributes. The initial data set was pre-processed as follows: 1. Some attributes such as age, income, and labor force were deleted due to duplications; 2. Income attribute, initially a numerical attribute, was converted into a nominal income range attribute. After pre-processing the number of attributes relevant to the classification, questions were reduced to seven attributes. Classifiers were constructed using rules and tree models. We applied different algorithms within each of the models and discovered that PART rule and random tree algorithms have the best performance. We have constructed a set of rules to answer each of the initial questions with high accuracy. For instance, with high confidence we can say: “If an individual is white AND an adult AND not in the labor force AND income range is lower-medium AND female, then such individual lives in Manhattan” (one of the constructed rules).

Predicting Employee Gender Based on Salary and Education in WEKA

Abdirahman Ahmed, Nicodemus Akuh, Michael R. Nganga

Faculty Advisor: Elena Braynova, Ph.D.

In recent years, and more recently with the elections coming up, there has been an ongoing discussion on gender equality at the work place with regard to pay. In our project, we predict the gender of an employee based on salary and education. The data set contains 474 instances and 10 attributes. We focus on three of the attributes: gender, education, and salary, and solve a classification problem for gender. We have used two tools: WEKA and Kdiff3, a text comparison tool, and constructed Tree classifiers using J48 and J48 GRAFT algorithms and evaluated their accuracy.

Body Fat Analysis

Pavani Mothe, David Passmore

Faculty Advisor: Elena Braynova, Ph.D.

In this project, we have studied a data set containing essential physical measurements of more than 250 male patients. Some of the physical measures are weight, height, chest, knee measures, age, and body fat, which is accepted as a major indicator of overall health. We have focused on this attribute and studied how to predict body fat accurately in the most convenient and least expensive way. We attempted to solve the following problems: 1. Clustering data to classify different body fat levels, and 2. Creating a regression model to make a prediction of body fat levels. We used data mining and machine learning techniques within Waikato Environment for Knowledge Analysis (WEKA) in order to find correlations and logical classifications of the patients. A variety of algorithms was chosen to classify the data and create a regression models. The results of this project can be applied in the real world to save time and resources when considering a patient’s weight and body composition.

Buying a Car: Can We Make a “Smart” Decision?

Randi Mull

Faculty Advisor: Elena Braynova, Ph.D.

In this project, I analyzed data about cars. The initial data set contains 400 instances and is defined by 10 attributes. Some of the data set attributes describe a car manufacturer, model origin, and year; the others describe technical parameters such as horsepower, acceleration, and more. I focused on the following classification problems: Can we predict a car’s origin based on the other given numerical attributes? Can we predict a car’s acceleration based on its weight and horsepower? I studied a variety of classification models and discussed their advantages as well as evaluated the efficiency of each constructed classifier. The results are represented using classification rules models (one R and Naïve-Bayes algorithms) as well as linear regression model for numerical prediction.

Applying to College: Which One to Choose?

Brendan O’Dowd

Faculty Advisor: Elena Braynova, Ph.D.

In this project, I am examining data that was collected by the U.S. Department of Education in 2013 concerning multiple factors related to undergraduate education. The data set contains 7,805 instances and 1,730 attributes. I am focusing on 11 of the attributes, including school location, school type, tuition, on campus or remote, admission rates, SAT/ACT scores, average tuition rates, number of undergrads, median debt after graduation, earnings after graduation, and graduates making above-average salary. I am trying to answer the following questions: 1) How does the school admission rate correlate to earnings after graduation? 2) Does salary after graduation depend on the type of school? 3) What can be said for SAT score requirements for different schools? 4) How are tuition cost and students’ debt and earnings after graduation related? The questions are formulated as classification and association rules mining problems. I used different knowledge representation models and a variety of data mining algorithms. I then compared and evaluated the results.

Tennis Analytics with WEKA

Laxmikant Paropkari

Faculty Advisor: Elena Braynova, Ph.D.

There are four major annual tennis tournaments: the Australian Open, French Open, Wimbledon, and U.S. Open. Each of them is very prestigious and involves large sums of prize money. In this project, I analyzed data for the Australian Open 2013 Men’s Tournament and the French Open Tournaments, then combined data from all the tournaments using WEKA. I focused on a specific classification problem: trying to predict the winner of a match based on information about the players. The data set is pre-processed as all numerical attributes are converted to nominal and the data is randomized. I constructed a classifier using the rule model, applying different approaches and algorithms, then compared and evaluated the results.

Artificial Neural Network Implementation of Data Mining Rules

Adam Pendleton

Faculty Advisor: Elena Braynova, Ph.D.

Artificial Neural Networks (ANNs) have the property of universality, which means that any problem which can be represented as a function can be solved by an ANN. One consequence of this property is that an ANN can be used in place of a set of rules when solving a data mining problem. While ANNs are typically used for numeric data, it is possible to use them on nominal attributes as well. Thus, any problem with a known rule-based solution in data mining can be represented as an ANN, which then may be used in a more elaborate neural system to solve more complex problems. The goal of this project is to provide a framework by which classification rules created for a data mining problem can be represented as an ANN. This can provide “plug-and-play” functionality for existing neural networks when the solution to a problem is known, as well as for training the neural network in new functionality that would otherwise be costly.

Name-Ethnicity Classification: Predicting Ethnicities Based on Names

Buvaneshwaran T, Elena Braynova, Ph.D.

Faculty Advisor: Elena Braynova, Ph.D.

In this project, I systematically study, explore, and investigate the most popular baby names by sex and mother's ethnicity in New York City in 2011 in order to establish facts, discover patterns, and reach new conclusions. The goal is to predict the ethnicities of babies based on their names and other additional information from the data set, which is split into two subsets: one containing female data and the other containing male data. I have calculated and added a few more attributes representing simple linguistic features of each name. Irrelevant attributes and duplicate instances initially present in the data set were removed. A variety of models have been utilized to study the classification problem for both subsets, and I have categorized each subset by using a variety of algorithms, evaluating the validity of each classification, and comparing the results and findings.

EDUCATION

AVID: Creating the School to College Pipeline**

Katherine Bunker, Scott Freniere, Daniel Livermore, Michael Lyons, Kathryn Bettley, M.A., Sara Young, Ed.D.

Faculty Advisors: Kathryn Bettley, M.A., Sara Young, Ed.D.

AVID (Advancement Via Individual Determination) is a global college readiness system dedicated to closing the achievement gap by preparing students for success in high school, college, and their careers, especially students who are traditionally underrepresented in higher education. AVID's research-based strategies and curriculum provide more than 30,000 educators with training and methodologies that develop students' critical thinking, literacy, and math skills across all content areas. Today, almost all of the middle and high schools in the Worcester public school system have adopted AVID strategies to meet the needs of students. Since January 2015, WSU students in the Secondary Educator Preparation Program have spent their pre-practicum hours getting hands-on experience in AVID in classrooms throughout the city. Students who are presently student-teaching will discuss the benefits of fieldwork in AVID-centric schools and how these experiences helped shape their philosophy of education. Panel members from the Worcester Public Schools will discuss the impact and benefits of welcoming college students into their unique learning community.

Autism Spectrum Disorder and the Need for Inclusion Classrooms**

Kayla Courtney, Audrea Lundstrom, Brady Phillips, Grace Vaccari

Faculty Advisor: Kirby L. Wycoff, Psy.D., NCSP

This research team developed a training program for elementary and middle-school students that focused on how to integrate and accept their special needs peers into general education classrooms. This training focuses specifically on teaching youth how to understand their peers who have Autism Spectrum Disorder (ASD) and thus create a more inclusive and safe classroom setting for all students. With the prevalence of autism in U.S. children increasing by 119.4 percent from 2000 (1 in 150) to 2010 (1 in 68), autism is the fastest-growing developmental disability in the United States (CDC, 2008, 2014). This research team will seek to empower both mainstream students and their teachers in how to incorporate their ASD peers into the classroom.

Code Blue**

Alexa Giordano, McKayla Hersom, Jonathan Lashua, Daniel Rivers

Faculty Advisor: Kirby L. Wycoff, Psy.D., NCSP

School shootings have, unfortunately, become a large topic of national discussion. In 2015 alone, there were 64 shootings in the United States in pre-K-12 educational settings. Many young innocent lives have been lost, and school safety protocols do not seem to be working. Children are the ones paying the heavy price and their anxiety rates are at an all-time high. Schools are not safe anymore, and as future educators, that is something that we would like to change. For this project, we have analyzed current safety protocols and will be discussing what we found. This project seeks to develop a best-practices model for what would be most effective in the case of an emergency. Our goal is to make schools safer while allowing students to feel comfortable—as they rightfully should be.

ENGLISH

The Goodbyemoon: A Memoir of Loss**

Amy Angell

Faculty Advisor: Elizabeth Bidinger, Ph.D.

A Commonwealth Honors Project

This story is a memoir which covers the last six days of my husband's life. Ray, my husband, was a Vietnam veteran who had been exposed to Agent Orange in 1968, which caused him to develop diabetes and then cancer in his fifties. After a two-year battle, he succumbed. His final days were spent in the Veteran's Hospital in Roxbury, and I spent those days with him in residence. I found that in that time, we finally had the leisure to remember and reflect on the happenings of what had been a very eventful life together. In that time, we managed to raise 11 children, and to become grandparents many times over. He was a man who left a great impact on all of our lives, mine especially, and the six-day period in the hospital functioned as something that I have called our "goodbyemoon", the reverse experience to the honeymoon, the time couples spend together at the beginning of a new marriage.

Introducing Elizabeth Bishop, Poetry, and Writing as a Process**

Kayleigh Berger, Kasey Wozniak

Faculty Advisor: Heather Treseler, Ph.D.

Funding Source: Undergraduate Summer Research Fund

A Commonwealth Honors Project

Elizabeth Bishop (1911-1979), born in Worcester, became one of the most influential poets of the 20th century. Bishop's writing and life story have the potential to impact local students, especially because her letters of correspondence, prose, and poetry all aided in her transcendence from material reality and confinement of place. We present manuscript drafts of "One Art," "In the Waiting Room," and "The Country Mouse" alongside their published versions, in order to engage students in an investigation of Bishop's writing process. From our research, we designed a teaching module that integrates larger themes such as making poetry accessible and the act of writing as a fluid process. Often, reading canonical works and writing formulaic research papers overshadow the creative process of writing poetry and prose; thus, our unit demonstrates how the Common Core standards can be met in innovative ways. This research project has allowed us to formulate a new pedagogical approach rooted in the study of a writer's process and not just her or his text.

The New Worcester Spy: Recent Projects and Developments****

Nicholas Clark, Madison Friend, Noah Goldfarb, Timothy Jarvis, Jennifer Johnson

Faculty Advisor: Hugh Wiese, Ph.D.

The *New Worcester Spy* is a diverse, rapidly growing student-produced publication at Worcester State. Over the past year, we have transitioned the publication cycle of the *Spy* to a weekly schedule and greatly expanded our content offerings. As a result, we have attracted new readers in significant numbers, with some stories garnering well in excess of 1,000 views online. In this panel presentation, five members of the *Spy*'s editorial staff will discuss these developments and some of their recent projects: News and Multimedia Editor Noah Goldfarb will talk about the two podcast series "Popcorn and Spoilers" and "Wormtown Story Slam"; Associate Editors Timothy Jarvis and Nicholas Clark will talk about their ongoing profile series focused on Worcester Art Museum staff members and their favorite works in the museum's collection; and Executive and Managing Editors Madison Friend and Jennifer Johnson will talk about their news and opinion writing for the *Spy* as well as the *Spy*'s overall production and publication process.

HEALTH SCIENCES

WSU Toolkit for Injury Prevention

Laura Bouvier, Dulce Rodriguez-Fernandez

Faculty Advisor: Syamak Moattari, Ph.D.

Funding Source: The Fairlawn Foundation Fund at Greater Worcester Community Foundation, The Health Foundation of Central Massachusetts

The “WSU Toolkit for Injury Prevention” website was created by students in the Community Health Improvement Plan (CHIP) program in the Health Sciences Department at WSU, under the instruction of Dr. Syamak Moattari. The site was created to provide educational and advocacy materials in support of Domain 4 of the Community Health Improvement Plan, which addresses violence and injury prevention in the greater Worcester area in an effort to achieve the plan’s overarching goal to make the CMPHA the healthiest sector in New England and Worcester the healthiest city by 2020. Domain 4 has set the goal of improving safety, reducing violence, and raising public awareness through a prevention and intervention approach; as such, the toolkit provides educational and promotional materials surrounding the relevant topics of child malnourishment, elder maltreatment, falls, road traffic injuries, and violence against women. As one of the spring 2016 CHIP interns, I will be maintaining the toolkit website by working to increase the website’s traffic through social networking and the creation of marketing materials such as newsletters, articles, and other campaigns.

Surveying and Improving the Knowledge of Youth on Concussions⁺⁺

Samantha Comeau, Douglas Kowalewski, Ph.D.

Faculty Advisor: Douglas Kowalewski, Ph.D.

A Commonwealth Honors Project

Concussions in sports, especially youth sports, are becoming more prevalent with each passing season. Concussions are debilitating and can lead to physical and psychological problems. In youth, they can be sustained in school, sports, or at home. The objective of this project is to increase the knowledge of concussions in youths, so that they can better understand what can result from a hit to the head. This project will include surveying four sections of youth before and after teaching them about concussions, either by using kinesthetic, auditory, reading/writing, or visual learning styles. The results will lead to an official lesson plan that will be presented to school officials and students to teach them about concussions in hopes of lowering the number of students who sustain concussions, and keeping them participating in class and daily activities.

Comparison of Dietary Intake and Athletic Profiles with Sports Performance in Middle-Age Competitive Recreational Athletes^{+=++}**

Melissa Fuentes, Olivia Guilmette, Richard Johnson

Faculty Advisors: Mariana Calle Ph.D., M.S., RD, LDN, Matthew Kostek Ph.D., CSCS, ACSM-EP-C

Funding Source: WSU Faculty Mini-Grant

Competitive athletes require specific exercise training and dietary management that differs from the recommended guidelines for general health and fitness. Recreational athletes who eschew such specific training increase their risk for sports injuries and/or illnesses, which if incurred result in a cessation of all leisurely physical activity for several days to several months. We intend to analyze dietary intake habits and quantify sport-specific athletic performance in middle-age (35-55 years old) recreational competitive baseball, tennis, and/or basketball athletes. Study findings will provide potential avenues for exercise and dietary intervention to improve performance and preparation for competitive sports in this population.

This is Global Health: A Review of Unintentional Injuries in the Middle East and North Africa⁺⁺

Taya (TaChalla) Gibeau

Faculty Advisor: Syamak Moattari, Ph.D.

This review focuses on unintentional injuries in the Middle East and North Africa (MENA) region, which measures are considered the best practices in avoiding preventable injury, and which may be extrapolated to other global regions. With constant conflict and media attention in the MENA region, more focus has been on war-related deaths and injuries than on accidents. After reviewing 13 different countries in the MENA region, the results show

a large gap in knowledge where only two prevention measures, both in Iran, were documented as being specifically successful. More primary research on unintentional injuries must be done in the MENA region. Based on the findings of this research, it can be concluded that there is insufficient data compiled on the MENA region in general; therefore, no particular information was gleaned that will be beneficial to other public health initiatives, excluding perhaps those mentioned in Iran.

Body Weight Management: A Comparison of Three Diet Tracking Programs

Mary McKeown

Faculty Advisor: Mariana Calle, Ph.D., M.S., RD, LDN

Funding Source: WSU Faculty Mini-Grant

This project compares the reliability of popular diet tracking tools used in weight management. Evaluating the reliability of these types of instruments is relevant, considering that more than one-third of Americans are commonly categorized as obese. More specifically, we will evaluate the validity and features of the popular applications versus the government's "Supertracker". The focus will be on key nutrients for the American diet, such as fiber, sodium, potassium, calcium, iron, vitamin D, saturated fat, carbohydrates, and protein. If we were to do an intervention to help people in the community manage their weight, this information would help them choose a reliable, cost-effective tool.

HISTORY

Preserving the Faith: The French Canadian Parishes of Worcester***

Zach Washburn

Faculty Advisor: Tona Hangen, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

The idea of "*la Survivance*" was imperative to the French Canadian migrants who settled in the Central Massachusetts region. The phrase itself doesn't have a direct English translation and can only be explained as the preservation of French Canadian language, culture, and faith outside of Canada. In this project, I examined how *la Survivance* was embodied through the four Catholic parishes established in Worcester between 1869 and 1904. Notre Dame des Canadiens, Saint Joseph, Holy Name of Jesus, and Saint Anthony's parishes all sponsored parochial schools with lessons exclusively in French. Also examined in this project is how these parishes fared in the latter half of the 20th century, with the decline of parish attendance eventually causing the closing and merging of all four parishes into one new parish, Holy Family Parish, and how the merger was an act of *la Survivance*.

LIBERAL STUDIES

Ethical Issues in a Diverse Society**

Vida Ampofo, Jillian Caduto, Brittany Vail, Rowan Weller, Brian Wheaton

Faculty Advisor: Barbara Zang, Ph.D.

This is a proposed syllabus for a first-year seminar. During the course, we would examine diversity and inclusion along with ethical issues that can arise in a diverse society. It is hoped that by the end of the semester, students would be prepared to meet the challenges that they would face in their careers by understanding how to integrate successfully into a complex, globalized society.

Woo 101**

Amber Anderson, E. Jasper Bliss, Florence Forges, Christina Gerardi

Faculty Advisor: Barbara Zang, Ph.D.

This proposed syllabus for a first-year seminar examines the opportunities for involvement in the city of Worcester. During the course, students would gain knowledge about the community and build connections to local organizations in a variety of areas. By the end of the course, first-year students would identify an area of interest for their major.

Adaptation and Acceptance of Diversity⁺⁺

Kiana Besse, Maura Gallagher, Nick Ray, Edlira Xhaferri

Faculty Advisor: Barbara Zang, Ph.D.

This is a proposed syllabus for a first-year seminar that would introduce students to all different types of diversity in the world as well as give them the intellectual skills to accept these diversities.

The History of Diversity and Inclusion⁺⁺

Emily Brown, Khris Cintron-Perez, Alyssa Herter, Joan Spinazola

Faculty Advisor: Barbara Zang, Ph.D.

The focus of this proposed First Year Seminar syllabus is the history of diversity and inclusion in the United States and how we might change things to assure better lives for people.

The Voice of Diversity⁺⁺

Lauren Dunphy, Carmel Harwood, James McCarthy, Yvonne Oratokhai

Faculty Advisor: Barbara Zang, Ph.D.

We designed this first-year seminar syllabus to represent the WSU student body appropriately as it relates to its community, country, and the world in order to create a respectful, safe environment for freedom of expression. After completing this course, we hope that students will feel comfortable joining communities that they either identify or do not identify with.

MATHEMATICS

The Sum of Powers and Tetrahedral Numbers^{*+=}

Sonila Ametaj, Russell Parker

Faculty Advisor: Susan Schmoyer, Ph.D.

How can we compute the sum of the k^{th} powers of the first n integers? It is well known that when k is equal to 1 that $1 + 2 + \dots + n = n(n+1) / 2$. To solve the problem of summing k^{th} powers in general, we will introduce the method of telescoping sums by providing a recursive formula, which we will use to prove the sum of powers theorem. We will also introduce the three-dimensional number shapes, also known as tetrahedral numbers, and illustrate this with pictures of three-dimensional pyramids (tetrahedrons).

Fibonacci's Rabbits

Kayla Brennan, Alison Feeney-Patten

Faculty Advisor: Susan Schmoyer, Ph.D.

In 1202, Leonardo Fibonacci introduced Europeans to the simple and now familiar Hindu/Arabic numerical system, which revolutionized Western mathematics. He also posed a question which puzzles students to this day: If you start with one pair of baby rabbits, and a month later the grown rabbits produce another pair of baby rabbits, how many pairs of rabbits will there be at the end of a year? The surprising answer leads into an exploration of number theory through the Fibonacci sequence. We will go down a rabbit hole of recursive formulas, which use preceding terms to determine the next terms. We can also use this to determine linear recurrence sequences, which combine a selection of those preceding terms into linear combinations. Along the way, students can contemplate the pleasing proportions of the Parthenon and compare them to spiraling leaves, nautilus shells, and the human figure.

The Water Tank

John Brizuela, Matthew Dogali

Faculty Advisor: Timothy Antonelli, Ph.D.

Many small towns are required to keep track of water levels in their water tank. Some communities don't have the technology, so they rely on the level of the tank recorded at a certain time. Furthermore, they may be unable to measure while the pump is on. We investigated a hypothetical small town that can only measure the water level of

its tank within 5 percent accuracy and use data to verify our model. The water tank is a vertical circular cylinder that stands 40 feet high and has a diameter of 57 feet. Our goal is to attempt to reconstruct the water flow from the given data and use it to predict the water level when the pump is on. The model will allow us to predict accurately how much water is filling, draining, and being used on a daily basis.

Diophantine Approximation and Pell's Equation

Matt Carpenter, Patrick Murray

Faculty Advisor: Susan Schmoyer, Ph.D.

We are going to show how one can find solutions to Pell's equation, which is $x^2 - Dy^2 = 1$. We will give a brief overview of Pell's equation as well as cover Dirichlet's Diophantine approximation theorem to show how it applies to Pell's equation. We used both Pell's equation and Dirichlet's Diophantine approximation theorem to prove that there is a way that one can find solutions to Pell's equation and provided an example showing how it applies to real numbers.

Diophantine Approximation and Pell's Equation

Eric Davis, Danielle DeRose

Faculty Advisor: Susan Schmoyer, Ph.D.

We will use Diophantine Approximation to find (x,y) solutions to Pell's Equation: $x^2 - Dy^2 = 1$, where D is a fixed positive integer that is not a perfect square. Then we will prove Dirichlet's Diophantine Approximation Theorem to show that there are infinitely many pairs of positive integers (x,y) that satisfy the equation $|x - y\sqrt{D}| < 1/y$.

Cubic Curves and Elliptic Curves

Elenor Drack, Courtney Pike

Faculty Advisor: Susan Schmoyer, Ph.D.

We will discuss different types of Diophantine equations, such as $y^2 = x^3 + 17$, and how different powers of these equations will affect their graphs. Additionally, we will explain how to find solutions for these equations and quantitative ways to measure "size" of coordinates on the graphs. Coordinates which can be found by solving Pell's equation and theorems such as Mordell's theorem will also be discussed.

A Formula for Success

Alison Feeney-Patten

Faculty Advisor: Eileen Perez, Ph.D.

WSU offers developmental mathematics classes designed to refresh the math skills that students need to succeed at WSU and beyond. For students in the education and mathematics majors, the University offers classes designed to develop a student's ability to think about mathematics from a teacher's perspective. Enrolling in WSU's Numbers and Operations for Teachers class while tutoring Developmental Math students through the WSU Math Lab offered valuable insight into the learning process. As a tutor, I learned about common math misconceptions and errors, then saw them in practice the same day. I developed a different perspective on math and education, and was able to guide students to new ways to look at and think about problems. This project explores these different math tracks, the connections between them, and how the experience of a future teacher can be enriched by experience with both.

Unique Factorization of Gaussian Integers

Nicolas Hebert, Kara Walsh

Faculty Advisor: Susan Schmoyer, Ph.D.

The Gaussian integers are the set of complex numbers $a+bi$, where a and b are integers and i equals the square root of negative 1. We will define a set of Gaussian primes and subsequently show that, similar to the Fundamental Theorem of Arithmetic, Gaussian integers can also be factored uniquely into a product of Gaussian primes.

Fermat's Last Theorem and Elliptic Curves

Sarah Kane, Jimmy Nguyen

Faculty Advisor: Susan Schmoyer, Ph.D.

It is well known from the Pythagorean theorem that it is possible to have the sum of two squared integers equal another squared integer; however, is it possible to find solutions when two integers, raised to a power greater than two, are added up? Pierre de Fermat showed that there is no solution for the exponent four. Later, Carl Friedrich Gauss and Leonhard Euler showed that there was no solution for the exponent three, and Lejeune Dirichlet and Adrien Legendre worked with the exponent five. Showing that $a^n + b^n = c^n$ has no solutions in positive integers if $n \geq 3$ is known as "Fermat's last theorem". Gerhard Frey began to find the connection between Fermat's last theorem and elliptic curves. His idea was to take a solution (a,b,c) to Fermat's equation and look at the elliptic curve $E_{a,b}: y^2 = x(x + a^p)(x - b^p)$, known as the "Frey curve". Andrew Wiles then proved every elliptic curve exhibits a modularity pattern, and the Frey curves are semistable. It was concluded that $a^p + b^p = c^p$ has no solutions in non-zero integers.

Number Theory and Imaginary Numbers

Amanda Lewis, Zachary Tremblay

Faculty Advisor: Susan Schmoyer, Ph.D.

We will present all materials related to number theory and imaginary numbers. Imaginary numbers are the set of all $x+yi$, where x and y are real numbers and i squared equals negative 1 while i is the square root of negative 1. We will also exhibit Gaussian integers, which are imaginary numbers $x+yi$, where x and y are integers instead of real numbers. The mathematical concept of rings will also be explained and we will prove that the Gaussian integers form a ring. Finally, we will define and explain what Gaussian prime numbers are as well as explain divisibility among Gaussian integers.

Binomial Coefficients and Pascal's Triangle

Janet Novack, Shaun Nystrom

Faculty Advisor: Susan Schmoyer, Ph.D.

We explore the power expansions of integer binomials and how they may be arranged and visualized in the form of Pascal's Triangle. From there, the wonder of Pascal's Triangle is explained via the derivation of the Addition Formula for Binomial Coefficients. Furthermore, the formulation for a binomial coefficient is shown through the Binomial Theorem, which we then narrow to the Binomial Theorem Mod (p) and show an alternate proof for Fermat's Little Theorem.

Neutron Activation Analysis of Old Coins

Adam Pepin, Nicholas Borges (Worcester Polytechnic Institute)

Faculty Advisors: Sudha R. Swaminathan, Ph.D., David Medich, Ph.D. (Worcester Polytechnic Institute)

In neutron activation analysis, a sample is made radioactive by irradiating it with neutrons. The radioactive atoms in the sample decay and emit gamma rays with energies which are characteristic of the chemical elements in the sample. Using a neutron source at Worcester Polytechnic Institute, we studied the elemental compositions of two coins: a Chilean silver coin from 1834 and an imitation of an 18th-century Spanish coin. Both coins were previously studied with X-ray fluorescence; however, neutrons go deeper into the coins than X-rays do. We calculate the mass of the elements with the neutron technique. We aimed to answer the following questions: Did the neutron probe find elements not seen in the X-ray study? What is the percentage of silver in each coin? What elements in addition to silver are present? Our results will be incorporated into the course materials for the course Physics in Art.

A Comparison of Double Elliptic and Spherical Geometry

Alicia Pickering

Faculty Advisor: Susan Schmoyer, Ph.D.

Euclidean geometry is a two-dimensional geometry of a flat surface. This is the more commonly learned geometry in high school and college; however, non-Euclidean geometries exist and have prevalence in the world. The main distinctions between Euclidean and non-Euclidean geometries are their properties of parallel lines. Elliptic geometry is based on the circle in two dimensions, whereas double elliptic geometry is specifically the geometry

of the three-dimensional sphere. Double elliptic geometry has many applications in the real world, as we live on a spherical surface. There are many similarities between Euclidean geometry and non-Euclidean geometries, such as elliptic geometry, though non-Euclidean geometries are more abstract than their counterparts. It is important, however, for students to be introduced to more abstract ideas earlier in their math career because it builds their higher levels of thinking.

Aerodynamics and Soccer Ball Trajectory

Zachary Tremblay

Faculty Advisor: Susan Schmoyer, Ph.D.

We will briefly discuss the required characteristics of FIFA-approved soccer balls as well as the differences between existing designs, and we will be paying particular attention to the two most recent designs, as they have created the most controversy. Aerodynamic properties will be discussed as thoroughly as possible to explain matters such as the magnus effect and Bernoulli's principle, and how aerodynamic forces affect the trajectory of a ball kicked with spin. A derivation of two-dimensional kinematic equations is given to show a satisfactory summation of a simplified trajectory exercise. Ultimately, we concluded that the curve of a soccer ball, when repeatedly kicked in the same fashion, primarily depends on the surface's roughness and the resulting value of the drag coefficient and lift coefficient. Math modeling will be used to characterize this trajectory and explain how much effect different aerodynamic forces have on the flight of a soccer ball.

NUCLEAR MEDICINE TECHNOLOGY

Cancer Risk Associated with Occupational Exposure among Nuclear Medicine Technologists**

John Grzyb, Jeff Robichaud

Faculty Advisor: Douglas Kowalewski, Ph.D.

There is a general understanding that the methods used in nuclear diagnostic and therapeutic procedures are inherently dangerous to the technician and the patient. We gathered the radiation exposure reports from UMass and St. Vincent's hospitals in Worcester to observe if there is a noticeable risk of developing cancer from constant exposure for technicians. Exposure data from each hospital was averaged and graphed to compare procedure risks. A cancer risk based on the amount of time the technologist has theoretically spent with exposure was found to be a linear relationship. The risk per year was calculated to be extremely low for 5-30 years of exposure ($< .01$) with no more than 100 hours off life expectancy, leaving the implication that there is an extremely small risk of cancer caused by nuclear medicine procedures and orders of magnitude—smaller than cancer rates received by survivors from atomic bombing radiation. The findings show that exposure levels attained in Worcester hospitals by technicians pose minimal threat.

Risk of Cancerous Tumor Based on Exposure to Ionizing Radiation for Nuclear Medicine Technologists and Patients at UMass Medical Center**

John Gryzb, Jeffrey Robichaud

Faculty Advisor: Douglas Kowalewski, Ph.D.

Nuclear medicine is an important tool when diagnosing certain diseases, including cancer and Alzheimer's. Technologists and patients are often subjected to significantly higher rates of radiation exposure. In this project, we estimated the risk for developing a fatal tumor based on exposure from procedures and patients. Based on the results, better safety measures could be implemented, and patients may assess their risk. Calculations of life-risk were made to estimate life-reduction based on mRem exposure. Average exposure rates of technologists were converted into a cancer risk. Twelve nuclear medicine procedures were analyzed to find the risk of cancer and life-reduction expectancy. It was assumed that radiation was the sole cause of the tumor. The risks turned out to be less than .2 risk/Sv. All procedures took less than 8,000 minutes off of one's life. Results suggest that nuclear medicine is safe for both technologists and patients.

NURSING

WSU CHIPs in Action: Focus on Cancer-Causing or Cancer-Associated Microbes, *Salmonella enterica***

Shelby Bronnes, Ruba Dabbagh, Colleen Walsh

Faculty Advisor: Roger S. Greenwell, Ph.D.

Funding Source: The Fairlawn Foundation Fund at Greater Worcester Community Foundation, The Health Foundation of Central Massachusetts

This project is a joint venture between students enrolled in BI-206 Medical Microbiology and the Greater Worcester Community Health Improvement Plan (CHIP), which includes students in the university Honors Program who are engaged in this project. One of the CHIP objectives in primary care and wellness is to raise public awareness about risks for cancer, including those cancers that are caused by or associated with microbes. This presentation is a culmination of our efforts to educate the public about how the bacterium *Salmonella enterica* serovar *Typhi* can lead to gallbladder cancer. We have generated a range of materials for distribution to engage the public about this important disease and educate people about additional outcomes from Salmonella exposure. Our efforts will be judged against a competing honors team whose project focuses on the Hepatitis C virus and cancer, mentored by Dr. Ellen Fynan. The winning team will be given a donation in its name to a medically-important foundation of its choice.

Worcester State University Sleep Awareness and Promotion

Kelly Burstall, Marissa Ferrera, Jessica Gale, Nicole Keenan, Amanda LaSpina, Caitlynn McCaffrey, Heather Vincequere

Faculty Advisors: Kelly Carlson, BSN, MSN, Ph.D., Melissa D. Duprey, Ed.D., MSN, BSN

Funding Source: WSU Honors Program
A Commonwealth Honors Project

Nursing students in the Honors Program have collaborated with WSU graduate student Karen Lajoie to educate and promote sleep in the WSU student population. Not getting adequate sleep negatively impacts one's health; as such, there is an identified need for an increased awareness of sleep deprivation and its effects in the WSU population. This project promotes sleep deprivation education through awareness. During a sleep promotion event, individuals identified the causes and effects of sleep deprivation and were provided techniques on how to counteract them. Education outcomes of this event included the importance of sleep, the amount of sleep needed each night, the effects of lack of sleep, the identification of common factors contributing to a lack of sleep, and ways to promote sleep. We have obtained general qualitative and quantitative data through research articles as well as WSU-specific qualitative and quantitative data from Health Services' surveys and 500 sleep-event surveys. This information will be utilized to help identify common sleep-related trends among this specific population so that specific sleep interventions can later be applied and analyzed.

Exploring Community Perceptions of Childhood Obesity**

Shannen Curtin, Henry Ellis, Suzanne Fowler, Elizabeth Gauvin, Kayla Grady, Kayla Pugliese, Zachary St. Amant, Allyson Sweet, Alexandra Wild

Faculty Advisors: Kelly Carlson, BSN, MSN, Ph.D., Patricia Moran, B.S., M.S.

Funding Source: The Fairlawn Foundation Fund at Greater Worcester Community Foundation, The Health Foundation of Central Massachusetts

Childhood obesity is a public health issue in Massachusetts and the rest of the United States. To aid in the prevention of childhood obesity, this research group will be conducting both quantitative and qualitative surveys to aid the understanding of the perceptions of the public in regard to exercise, mental health, and nutrition of young children. English and Spanish surveys will be available in seven cities and towns in Worcester County at facilities that are responsible for child services. In addition to the quantitative data, the research group will be conducting approximately 10 focus groups at the same locations. The hypothesis is that the results of the study will show a knowledge deficit concerning the health needs of young children and a lack of education about health-promoting activities that young children should be involved in. This data will be analyzed and an intervention regarding communities' perceptions about the development of childhood obesity will be designed to help prevent further development of childhood obesity in young children. After the intervention has been carried out, further studies will be conducted to observe its effectiveness.

WSU CHIPs in Action: Focus on Cancer-Causing or Cancer-Associated Microbes, Hepatitis C Viruses⁺⁺

Sarah Khallady, Lauren McCarthy, Jennifer Rearick and Abigail Sniegocki

Faculty Advisor: Ellen Fynan, Ph.D.

Funding Source: The Fairlawn Foundation Fund at Greater Worcester Community Foundation, The Health Foundation of Central Massachusetts

This Honors Program project is a joint venture between students enrolled in BI-206 Medical Microbiology and the Greater Worcester Community Health Improvement Plan (CHIP). One of the CHIP objectives in primary care and wellness has been to raise public awareness about risks for cancer, including those cancers that are caused by or associated with microbes. This presentation is a culmination of our efforts to educate the public about the different types of cancers and the risks that can happen if one acquires viral infections of Hepatitis C. We have generated a range of materials for distribution to engage the public about this important disease. Our efforts will be judged against a competing honors team project on cancers caused by the bacterium *Salmonella enterica*, mentored by Dr. Roger Greenwell. The winning team will be given a donation in its name to a medically-important foundation of its choice.

The Impact of Community-Administered Naloxone on Opioid Overdose

Erin N. Shanahan

Faculty Advisor: Melissa D. Duprey, Ed.D., MSN, BSN

There is a growing epidemic of opioid-related deaths in the United States, creating a major public health crisis. Naloxone, an opioid antagonist, has been used for years by medical professionals to reverse opioid overdoses; however, most patients arrive to the emergency department too late to receive the drug. In the late 1990s, prevention programs began supplying Naloxone in the community to high-risk opioid users and their families in an effort to decrease mortality from opioid overdose. The purpose of this systematic review is to explore the effectiveness of community-administered Naloxone as related to opioid overdose. Current evidence supports the use of community-administered Naloxone as a life-saving drug for opiate overdose-related deaths. Further education is proposed to reduce judgment by health care workers to treat this epidemic as a disease, not a moral deficit. Recommendations are made for administration protocols, training, and public availability with automated external defibrillators.

NURSING – COMMUNITY AND PUBLIC HEALTH**The Opioid Crisis in the United States and Steps Massachusetts Has Taken to Combat It***

Kerridan L. Banfill, BSN, RN, WCC, MSN(c)

Faculty Advisor: Greg Shuler, M.S., RN-BC

The opioid crisis in America is at an all-time high. The rate of American deaths as a result of opioid abuse has nearly tripled between the years of 2000 and 2014. Through the use of Naloxone (Narcan), many of these deaths can be prevented. This poster presentation will highlight interventions Massachusetts and its individual communities are taking to educate and protect their citizens from what are often unnecessary overdoses and deaths. The poster will include sections that describe and assess the problem and its magnitude, evaluate its causes and determinants, and discuss prevention and intervention strategies, including defining what Narcan is, how it is used, and how to obtain it. The Massachusetts Department of Public Health has designated AIDS Project Worcester as the Narcan education and distribution site for Worcester County, and its mission, objectives and outcomes will also be included.

Risk Stratification and the Home Health Patient: Should Risk-Screening Tools Be Adapted to Identify “High-Risk” Home Health Patients?*

Laura Berg, M.S.(c), B.S., ADN, RN, CCM

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

Effective management of patient care coordination and reduction of patient re-admissions is of relevant importance in this time of reduced Medicare reimbursement and the utilization of Accountable Care Organizations (ACOs). Through a process of identification of high-risk patients, a home health agency may identify patients who are at high risk for such things as hospital re-admission or failure of sustaining the ability to manage their health care within the home setting. The purpose of this project was to research, identify, and define what a “high-risk” patient

is related to home health care. The efficacy and applicability of current tools for risk identification were researched through a literature review. With this information, recommendations were made for interventions that can be implemented to better manage “high-risk” patients within home health.

Educational Discharge Tools for Patients Suffering from Multiple Sclerosis*

Jaclyn M. Bianca, EMT, RN, CNE, MSN(c)

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

Multiple Sclerosis (MS) is a random and often incapacitating disease that affects the central nervous system (CNS). The brain, spinal cord, or both can be involved in the diagnosis. With MS, the myelin sheath that covers the nerves that allows communication between various parts of the CNS starts to demyelinate, causing communication errors between the nerves, which result in a multitude of symptoms. The focus is to keep MS attacks at bay with disease-modifying drugs. The cause of MS is still unknown and there are no cures at this time. The Mandell Center for Multiple Sclerosis is a comprehensive care facility in Hartford, Connecticut, that is dedicated to those individuals who suffer from MS. It has a nationally recognized team of MS specialists and an expansive variety of therapeutic programs that cater to the MS patient as a whole. As part of this project, I developed discharge tools to help better educate their patients with common MS issues.

Public Education on Tick-Borne Illnesses in Sudbury, Massachusetts*

Anjellica Clinton, BSN, RN, MSN(c)

Faculty Advisor: Greg Shuler, M.S., RN-BC

In 2014, tick-borne illnesses accounted for 36 percent of all reportable diseases in Sudbury, Massachusetts. There were 125 confirmed communicable diseases, with 36 being tick-borne. From these statistics, it was found that education was the primary variable to decrease the illness. The Sudbury Department of Health created the initiative to educate the at-risk populations to foster better preventive measures. To achieve this goal, methods used included the distribution of informative materials throughout the town. Their details were analyzed, examined, and expanded upon through discussion to create this poster presentation. By examining the results, education can be distributed to other communities regarding tick-borne illnesses. Continued evaluation of reportable illnesses can be conducted to determine if outreach has decreased the incidences of tick-borne diseases.

The Importance of Farmers’ Markets in Low-Income Communities*

Fernanda Costa, B.S., RN, MSN(c)

Faculty Advisor: Greg Shuler, M.S., RN-BC

Chronic diseases are responsible for the majority of disabilities and health care spending in the United States, and low-income communities are particularly vulnerable. Research indicates that such families consume fewer fruits and vegetables than upper class families; therefore, their risk of developing chronic conditions is proportionately higher. This review analyzes the growing trend of farmers’ markets in the United States and what can be done to encourage lower-income families to utilize them. Results suggest that the main obstacles preventing poor communities from consuming more fruits and vegetables from farmers’ markets are lack of financial incentives (e.g., coupons) and limited accessibility (e.g., transportation). Provider and patient education also plays a role, but not nearly as much as finances and accessibility. Further research is needed to determine participants’ attitudes regarding immediate financial loss versus long-term benefits of utilizing farmers’ markets as well as incentives for prevention versus treatment of chronic diseases.

Reducing Catheter-Associated Urinary Tract Infections (CAUTI) While Implementing Nurse-Driven Protocol*

Daniella DeOliveira, B.S., RN, MSN(c)

Faculty Advisor: Greg Shuler, M.S., RN-BC

Catheter-associated urinary tract infections (CAUTI) are the most common yet preventable reported health care-associated infections, which contribute to longer hospital stays, increase costs, and hinder patient recovery. In an effort to reduce CAUTI rates, many acute-care hospitals have implemented nurse-driven protocols that use evidence-based nursing tools to guide nursing practice in streamlining the removal of urinary catheters. Research shows that this intervention not only improves CAUTI rates, but also helps empower nurses and increases autonomy. This poster presentation reviews an evidence-based CAUTI prevention tool and how the implementation of a nurse-driven protocol can help reduce CAUTI in patients.

Concussion in the Student Athlete*

Carolyn Griffin, BSN, RN, M.S.(c)

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

Over the past 10 years, sports-related concussions have been garnering more attention as the public becomes aware of the possible long-term consequences. While the media's spotlight has been on professional athletes' experience with concussions and its effects, it is actually children and adolescents, particularly student-athletes, who are the most vulnerable to the effects of sustaining a concussion. With newfound research and understanding of the effects of a concussion and the dangerous risks of second-impact syndrome, concussions have become an important public health issue. This poster serves to provide information about concussion in the student-athlete and highlight a concussion community education program conducted in a Central Massachusetts town.

Workplace Violence in the Hospital Setting*

Jennifer Hall

Faculty Advisor: Greg Shuler, M.S., RN-BC

The hospital is a setting where stress and tension can run high—not only among patients, but staff as well. This can set the stage for violence to occur in all forms. Multiple studies have revealed the types of violence that often occur in hospitals. This poster will outline the types of violence that occur, those affected, signs of violence, and strategies to prevent and reduce the amount of violence that takes place.

Adolescent Backpack Use and Its Relationship to Overall Spinal Health*

Tina Hill, BSN, RN, MSN(c)

Faculty Advisor: Greg Shuler, M.S., RN-BC

The aim of this poster is to raise awareness about adolescents' backpack use and how it affects their rapidly growing musculoskeletal system. It explores the relationship between carrying posterior weights and postural alignment. The school nurse is in a strategic position to advocate for overall spinal health in adolescents as a primary prevention strategy against adult spinal issues.

Ebola in Liberia: The Culture Impacts, Change, and Integrations that Made the Difference*

Lovo D. Koliego-Narmah

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

The recent West African Ebola epidemic is said to be the largest since its initial outbreak in 1976. The World Health Organization February 16, 2016 Ebola situation report indicates 28,603 total cases and 11,301 deaths cumulatively in Guinea, Liberia, and Sierra Leone. The rapid spread and increased death rate was attributed in part to the lack of knowledge and the health behaviors and cultural practices of the inhabitants of the countries, thus emphasizing the need for change. Change, however, can be difficult and challenging, especially where it is not viewed and/or valued as an immediate need. The goal of this poster presentation is to correlate the previous health behaviors and cultural practices to the increased death rate, discuss the change process, and indicate how the integration of other health behaviors and culture practices influenced, impacted, and enhanced the eradication of the disease—thus making the urgent need for change evident.

Using Transportation to Improve Population Health: Opportunity for Public Health Nurses*

Karen M. Lajoie, B.S., RN, NCSN, M.S.(c)

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

Transportation infrastructure in the United States is being rebuilt while our population faces the challenge of reducing our carbon footprint and the cost of chronic illness to society. Transportation, a social determinant of health, affects other determinants: access to care, education, food, and employment. Transportation infrastructure (part of the built environment) can be used to influence public safety, physical activity, social/economic connectivity, air quality, and other health determinants. Designing transportation systems to meet the changing needs of society requires interdisciplinary collaboration. Public health nurses have the opportunity to contribute skills and knowledge on these teams. This poster identifies transportation planning as an arena for public health nurses to impact population health by creating interdisciplinary teams to solve a significant problem.

Medway Youth Tobacco Initiative*

Jeanette Lucas

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

Funding Source: Massachusetts Department of Public Health

Tobacco use is the leading cause of preventable death and disease in the United States. Ninety percent of adult smokers begin using tobacco at or before age 18, when the brain is still developing and highly sensitive to the addictive properties of nicotine. Research suggests creating school-based programs using Centers for Disease Control and Prevention (CDC) guidelines will help prevent tobacco use and addiction among youth. An educational program for tobacco use prevention and cessation was developed describing health hazards and psychosocial factors related to tobacco use among children and adolescents. Youth-focused tobacco education also included refusal skills, alternative coping strategies, and resources for quitting. The goal of this project is to reduce tobacco use and addiction among youth in Medway.

Importance of a Survivorship Program in Patients Post Cancer Treatment*

Patricia Mitko

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

People are being diagnosed with cancer earlier and have many more treatment options than in the past. As a result, they are living much longer. They are now dealing with unique concerns and needs after cancer, including moving on after cancer, financial concerns, fears, and long-term effects. This poster looks at the importance of addressing their needs post-treatment and the importance of a survivorship program.

Occupational Health and Safety of Wind Turbine Workers*

Mary J. Moynihan

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN, FNAP

Confronted with the inevitabilities of climate change, the need to reduce non-renewable resources as our primary supply of fuel is driving the development of green jobs. Wind farms are being installed across the nation to generate energy at a reduced cost and to unburden the environment. The wind industry will take us into uncharted waters regarding worker health and safety. This “new” technology produces workers with familiar skills, and yet the unique hazards of these jobs need thorough investigation to ensure worker health and safety. Occupational hazards and worker protection in the areas of falls, climbing fatigue/ladders, respiratory protection, fires, confined spaces, electrical, and machine guarding are presented in this poster presentation.

Importance of Post-Hospital Discharge Follow-Ups by Registered Nurses in Primary Care Offices*

Laurie Mungoven

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

In 2011, there were approximately 131 million visits to the emergency department (ED) nationwide, and about half of those visits resulted in hospital admittance (Weiss, Wier, Stocks, & Blanchard, 2014). Many patients are using the ED as a substitute for a primary care practitioner (PCP) for both non-emergent and emergent health issues. ED visit costs are substantially higher than a PCP office appointment or even a visit to an urgent care clinic. A 2013 National Institute study found the average ED visit costs between approximately \$1,233 and \$2,168 (Fay, 2016). Post-hospital telephone follow-ups by registered nurses are a cost-effective intervention to decrease health care costs as well as unnecessary ED visits, concurrent ED visits, hospitalizations, and re-hospitalizations.

Strategies and Interventions to Improve Outcomes for Infants Diagnosed with Neonatal Abstinence Syndrome: A Literature Review*

Lianne Renaud, B.S., RN, MSN(c)

Faculty Advisor: Stephanie Chalupka, Ed.D., RN, PHCNS-BC, FAAOHN

Neonatal abstinence syndrome (NAS) is a term for a group of symptoms that an infant experiences when withdrawing from prenatal exposure to opioids. The rate of infants born with NAS has grown significantly in past years. In 2000, 1.2 per 1,000 hospital births were diagnosed with NAS, and it rose to 5.8 per 1,000 hospital births in 2012. In New England, the numbers are even higher, at an alarming rate of 13.7 per 1,000 hospital births. NAS is a qualifying diagnosis for children under the age of three in the Massachusetts Early Intervention system. I

participated in a Massachusetts Department of Public Health workgroup on NAS, which brought stakeholders together to develop a position paper that would be disseminated to early intervention clinicians across the state. To help guide this paper, a literature review was conducted of current research on short- and long-term effects, interventions, and strategies when working with this complex population.

OCCUPATIONAL THERAPY

Informal Caregiving and the Impact on Social Participation*

Melissa Balich, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to explore the impact that informal caregiving had on social participation. For the study, a 17-question semi-structured interview was administered to six informal caregivers in the comfort of each participant's home. Interviews were analyzed through Atlas.ti software where themes were developed and coded accordingly. Results showed that the researcher identified five themes that emerged from the six interviews, which included changes in priorities, loss of spontaneity, support systems, positivity, and greater bonds with loved ones. My conclusion is that these results suggest that despite all of the challenges and demands of informal caregiving, the caregivers do not view this new role or their decrease in social participation as a burden. Occupational therapists can improve the overall health and well-being of informal caregivers by promoting a balanced lifestyle as well as educating them on important strategies to reduce stress and manage time.

The Lived Experience of Sports-Related Concussion*

Julia Caruso, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The objective of this study was to understand the unique, lived experience of sports-related concussion on student-athletes in order to best facilitate their recovery, including return to academic and social roles. Our method used a qualitative approach by conducting a semi-structured interview of participants. Participants reported physical and cognitive symptoms that presented challenges in their ability to participate in valued academic, social, and athletic activities. Diagnosis and management of the participants' injuries were complicated by their lack of understanding of how symptoms present themselves and progress. This misunderstanding often delayed diagnosis and resulted in a lack of formal support when returning to academic and life roles. In conclusion, this study highlighted the need for an individualized, concussion management plan for student-athletes. Those in a supportive role could use this information to create and implement a concussion management plan that will facilitate the student-athlete's recovery and return to valued life roles following a sports-related concussion.

Evaluating Ergonomic Workstations Among Adults*

Rachel Collins, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to quantify the presence of common risk factors and pain that occurred for individuals with an office job at their workstation. This was a quantitative study including 32 participants at one work location, and results showed that there was no significance between pain and the participants' workstations. Although research has demonstrated that pain can be found due to poor ergonomics and the workstation set-up, my study showed that there was no significance found between pain and the workstation.

The Effects of Activities Programs on Quality of Life of Nursing Home Residents*

Amanda Fortier, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The objective of this study was to determine if activities programs implemented in nursing homes have an impact on the quality of life of elders in terms of leisure and social participation. Surveys inquiring about quality of life in relation to leisure and social participation were given to 30 nursing home residents. The participants indicated that engagement in the activities offered did have a positive influence on quality of life. Additionally, quality of life in relation to social participation was positively affected by engagement in the program. The number of days per week a resident participated did not appear to have an impact on quality of life. In conclusion, these findings support

participation in nursing homes' activities programs in order to influence quality of life positively among elders in the areas of leisure and socialization.

The Effects Mixed Martial Arts Has On Social Interaction and Participation in Children with Autism Spectrum Disorder*

Ashley Killam, OT/s, Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to analyze parents' perspectives to determine if mixed martial arts (MMA) positively influences social interaction, transition to group play, and occupational participation in children diagnosed with autism spectrum disorder (ASD). Our methodology used a qualitative approach with a semi-structured interview and questions about parents' children's social skills, play, and occupational participation throughout participation in Mixed Martial Arts for Autism (MMA4A). The results show that parents expressed positive changes in their children's social skills and stated how MMA4A strengthened their relationships with their children with ASD. The structure and familiarity of MMA4A allowed their children to participate appropriately in daily occupations. No results were able to support the transition from solitary play to group play in children with ASD. In conclusion, MMA4A allowed children with ASD to improve their social skills among peers and family and to have the ability to improve occupational participation.

The Effects of Ergonomic Techniques Among Individuals With Hand Osteoarthritis While Typing*

Colleen Liston, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of the study was to examine the pain level of individuals who have osteoarthritis before and after receiving ergonomic education. The study was a pre-test, post-test design and included 31 participants who completed a questionnaire and then took a one-minute typing test. Following the typing test, participants filled out a survey that inquired about their pain and test results. Once the survey was completed, participants partook in a brief ergonomic educational session. After the session, participants retook the typing test and completed the survey a second time. Our results showed that participants reported more pain on the pre-test as well as tallying more words per minute. The post-test results showed a significant positive impact by decreased pain levels and a significant negative impact on the amount of words typed. The findings suggest that individuals with osteoarthritis have less pain and type fewer words when applying ergonomic techniques to the occupation of typing.

Life with a Developmentally Disabled Child and the Coping Techniques Used by the Families*

Krista Luchette, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

This study examined the challenges faced by families who raise a child with a developmental disability and focused on the coping techniques each family implemented to maintain a healthy lifestyle. Six parents were given a semi-structured interview at a convenient location for this qualitative study. Our findings from this study showed that families who raise a child with a developmental disability all experience similar struggles and cope in similar ways. Three common themes were uncovered in the data: (a) spouses work together to create a lifestyle that accommodates the child, (b) insurance and MassHealth cover the majority of expenses, and (c) parents turn to informal and formal supports as coping styles. The results concluded that with the help of different coping techniques, it is possible to overcome many barriers and live positive and vigorous lives when raising a child with a developmental disability.

The Psychological Effects of Driving Loss in the Elderly*

Kayleigh Martins, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

Driving an automobile is an important instrumental activity of daily living (IADL) because it provides independence and community access. Yet, many elders lose driving abilities due to age-related changes. This study evaluated the psychological effects of driving cessation to determine if occupational therapists can provide intervention strategies for this population. Forty-six participants were given a screening tool called "The Assessment of Readiness for Mobility Transition" (ARMT), which contained 24 questions regarding emotional and attitudinal readiness for mobility changes. During the study, participants demonstrated high ARMT scores, indicating that elders experienced depression, anxiety, isolation, and perceived burden. High total scores suggested high risks of

psychological effects and a low readiness to switch to alternative forms of community mobility. This study provided evidence of an association between psychological behaviors and driving cessation. Occupational therapists can educate elders to use proper planning techniques that will maintain a more positive quality of life.

Effects of Hippotherapy on Attention in Children with Autism from the Parents' Perspective*

Shannon Nunzio, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

Hippotherapy is an intervention used in children with Autism Spectrum Disorder (ASD). This study evaluated the direct effects on sensory-processing skills, particularly attention, in children with ASD from the parents' perspective after hippotherapy sessions. Thirty parents were surveyed at a riding center in Bristol County, Massachusetts, where they were surveyed on the effects of hippotherapy on children with autism directly after these sessions. The research showed that noticeable positive effects were seen in children in five out of the seven areas of sensory-processing skills. Although there were no significant correlations found, the majority of the parents felt the sessions were overall effective in some positive way.

The Effect of Widowhood On Roles, Routines, and Habits*

Ellen Snyder, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to investigate how losing a spouse affected one's roles, routines, and habits. The design of this study was qualitative, using semi-structured interviews with open-ended questions. The participants I interviewed were members of a social activities group for widows and widowers. Results showed that individuals were successful in making changes to their roles, routines, and habits, which promoted positive growth and well-being. The way they adapted the roles, habits, and routines was dependent on their personality, the prior level of socialization, and types of occupations that he or she participated in. There are several limitations affecting the ability of the data to be generalized. In conclusion, the main findings from this study demonstrated the individualized progression of rebuilding one's life, starting with defining new roles, forming habits, and establishing routines. Mastering a small change encouraged a sense of control over one's life, which generated a feeling of self-efficacy.

Screening and Treatment of Depression by Occupational Therapists*

Thomas Savini, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The objective of this study was to identify if occupational therapists screen and treat for depression in their clients with CVA, TBI, and SCI. This study also aimed to identify what screening tools and treatment techniques occupational therapists were using to treat depression in these populations. Participants from four occupational therapy state associations (n=26) responded to an online survey distributed by each association. Only 50 percent of the occupational therapists surveyed screened for depression in clients with physical disabilities. A higher percentage of therapists was found to be treating depression than those who screened for it. The most popular intervention method was a referral to psychotherapy. Based on their training and mission, occupational therapists are required to treat both the mind and body; however, only half of all therapists surveyed looked at the psychological symptoms of their clients' physical disabilities, indicating that therapists are not using holistic practice.

The Effectiveness of a Water Exercise Program on Older Adults*

Steve Stanley, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to evaluate the perceptions of potential health benefits with older adults who participated in a water exercise program. Thirty participants attended the water exercise program, with all participants completing a survey that addressed their perceptions of the effects of the program. The study found that the more years participants were enrolled in the water exercise program, the more they reported an increase in their endurance. Participants with arthritis reported a decrease in pain both during and after the program. Other participants said that they had increased confidence that they would not fall while walking and also had an increased perception of endurance, balance, satisfaction with physical function, flexibility, and quality of life. The results support the use of water exercise as a program that can positively benefit older adults in a number of ways.

Understanding the Impact of Low Vision on ADLs and IADLs*

Kathryn Stone, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to understand the challenges individuals with low vision face when participating in daily occupations. This qualitative study included semi-structured interviews that collected data on the daily occupational experiences of six individuals with low vision, regarding Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). The results show that IADL participation is affected more often than ADL participation, due to the fact that some of these activities require certain visual skills and/or require individuals to leave their homes. Successful participation in activities depended heavily on environmental factors such as lighting, organization, and familiarity. In conclusion, this study helped to determine further both the performance barriers and facilitators for individuals with low vision. The study results can assist practitioners in selecting effective interventions with a specific focus on IADLs while increasing safety, participation, and independence for individuals with low vision.

School Bag Related Musculoskeletal Pain*

Taylor Tomasetti, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to determine the prevalence of school-bag-related musculoskeletal pain and the relationship to school-bag weight in college students. Our method used undergraduate student participants at WSU, who answered student-designed surveys that gathered information regarding students' demographics, musculoskeletal pain, and individual habits. Body weight and backpack weight were measured to determine how many students carried a school bag greater than 10 percent of their body weight. The results of this study showed that 17 of 49 participants carried a school bag 10 percent or greater than their body weight. A significant larger number of female participants reported pain compared to the male participants. Pain was most commonly found in the low back, middle back, and shoulders. In conclusion, this study shows that occupational therapists play a crucial role in educating students in school-bag ergonomics to help prevent musculoskeletal pain as well as the long-term impact.

Physical Activity and its Effects on Quality of Life in the Veteran Population

Paige Viveiros, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

The purpose of this study was to see if physical activity had an effect on the quality of life of a veteran. Using a qualitative design, this study had six veteran participants who were given a semi-structured interview relating to quality of life and physical activity. Data was collected and analyzed using the ATLAS.ti 6.2 and the SPSS Statistics 22 software. Results showed that there were four apparent themes, including: (1) quality of life is not affected by physical health issues, but by one's physical activity level; (2) physical activity has a positive effect on quality of life in veterans who consider themselves physically active; (3) veterans who are not as physically active as they want to be do not have time to participate in physical activities unless they are work-related; and (4) one's current physical activity level was not affected by being in the military. In conclusion, this study found that physical activity has a positive impact on quality of life and the number the years of military service did not have any impact on the current activity level of the participants.

The Effects of Community/Senior Center Involvement on Elder Quality of Life*

Katherine Zanchi, OT/s

Faculty Advisor: Joanne Gallagher-Worthley, Ed.D., OTR/L, CAPS

This study evaluated the social, physical, and cognitive aspects of attending a community/senior center and its influence on elder quality of life. For this study, surveys from 61 elder participants from two Massachusetts community/senior centers, who were 65 years of age or older and English speaking, were analyzed for statistical significance. Based on survey results, the overwhelming majority of participants reported feeling personal gratification, fulfillment, and satisfaction as a result of participation in community/senior center programs. Their involvement also allowed maintenance of physical and mental health as well as independence. Overall, involvement in programs and classes offered at the centers contributed to increased quality of elder life. This study reinforced the idea that the work of occupational therapists is essential in promoting health progression and maintenance

through activity involvement and community engagement. It was evident that social, physical, and cognitive engagement had many benefits to the elderly population, and that it increased their overall health, well-being, and quality of life.

PHILOSOPHY

Dance Movement Therapy: Rewriting the Metaphor-Memory Connection for Better Health and Well-Being⁺⁺

Maria Milendorf

Faculty Advisor: Elena Cuffari, Ph.D.

Clinical cross-disciplinary studies focusing on embodiment, memory, and metaphor have continued to show the interdependent relationship between organism and environment and its implications for health and well-being. There is evidence that traumatic memories are not only stored in the mind, but can get trapped in the body as well. Furthermore, people can experience certain emotions by positioning their bodies in certain ways. In one study, patients were better able to recall bad memories when their bodies were moving down as opposed to up. In another study, patients were able to identify and release traumatic memories after they positioned their bodies in ways that are metaphorically congruent to those memories. These studies suggest that body movement may be necessary for helping patients let go of past memories. In addition, body movement can help patients rewrite their metaphor-memory connection. Because we all experience some form of trauma in our lives, I posit that dance movement therapy and mindfulness as consistent practices can be beneficial for everyone's health and well-being.

PHYSICAL AND EARTH SCIENCES

The Impact of OSHA Reporting Policy Changes on Workplace Safety⁺⁺

David Civiok

Faculty Advisor: Douglas Kowalewski, Ph.D.

The aim of the Occupational Safety and Health Administration (OSHA) is to protect employees by developing, implementing, and enforcing safety standards in a workplace environment. My goal is to evaluate how a change in reporting requirements implemented in 2002 influenced the amount of lost time injuries reported. Due to some states regulating their own workplace safety (as opposed to being federally regulated), are similar reporting trends seen in state-enforced regulations as compared to federal-enforced regulations? Do these trends apply to all locations of the body? Finally, I ask, has the proportion of events per age group changed, which suggests an age bias in OSHA reporting policies? Initial findings show that this policy change has affected recorded lost time and types of injuries, but has not influenced additional reporting for any particular age group. State and federal enforcement, while similar, may play different roles in the types of injuries reported.

Lake Sediment Based Insight Into the Deglaciation and Post-Glacial Climate and Environmental History of the Mealy Mountains, Southeastern Labrador, Canada

Jim LeNoir, Tim Cook, Ph.D.

Faculty Advisor: Tim Cook, Ph.D.

Funding Sources: WSU Honors Program, Worcester State Foundation, American Chemical Society Petroleum Research Fund

A Commonwealth Honors Project

The Mealy Mountains (53.6° N, 58.6° W) of southeastern Labrador, Canada, are a glacially formed mountain range. Sediments from multiple lakes include laminated, minerogenic glacial-lacustrine sediment that transitions to organic-rich gyttja recording the deglacial to post-glacial evolution of the region. Retreat of the Laurentide Ice Sheet in the Mealy Mountains is believed to have occurred between 9,000 and 10,000 calendar years before present day. Radiocarbon ages from lakes in the Mealy Mountains place the local timing of the transition to post-glacial sediment at approximately 5,000 to 6,000 calendar years before present day. These dates suggest the presence of lingering ice at higher elevations or the formation of local mountain glaciers during the early Holocene. Measurements of loss on ignition, magnetic susceptibility, and X-ray fluorescence helped identify the transition from glacial to post-glacial sedimentation and provide additional insight into the post-glacial history of the region.

Chemical Analysis for the Presence of Bisphenol-A in Water Samples from the Mealy Mountains, Southeastern Labrador, Canada

Jim LeNoir, Meghna Dilip, Ph.D., Kathleen Murphy, Ph.D.

Faculty Advisors: Meghna Dilip, Ph.D., Kathleen Murphy, Ph.D.

Funding Source: Worcester State Foundation

Bisphenol- A (BPA) is a slightly toxic substance that is commonly used in the manufacturing of plastics. Long-term low-level exposure of BPA has been connected to mammary and prostate cancer, genital defects in males, early onset of puberty in females, and behavioral problems such as attention deficit hyperactivity disorder. Lake water samples collected from the Mealy Mountains (53.6° N, 58.6° W) of southeastern Labrador, Canada, were analyzed for the presence of BPA using published Liquid Chromatography/Mass Spectrometry techniques and Elisa assay techniques. The study area was uninhabited and removed from direct human impact, and the presence of BPA in water samples would indicate large-scale atmospheric transport of industrial pollutants and demonstrate the pervasiveness of the impact of plastics in modern society.

A Paleolimnologic Perspective on Recent Catastrophic Drainage of a Post-Glacial Lake in the Clyde River Valley, Northeastern Vermont

Erica L. Lucier, Timothy L. Cook, Ph.D.

Faculty Advisor: Timothy L. Cook, Ph.D.

Funding Sources: Northeast Climate Science Center, Worcester State Foundation, Student Research, Scholarship, and Creative Activity Grant

Naturally dammed lakes of glacial origin tend to have short lifespans of less than 1,000 years. Contrary to that, there have been records of paleo-glacial lakes persisting for thousands of years such as Glover, now known as Runaway Pond, in Vermont. This lake persisted until 1810, when it was drained due to human activity. This study focuses on an area in northeastern Vermont that may have been inundated by a large paleo-glacial lake for a particularly long time. To shed light on the suspected existence of this long-lived glacial lake and its recent drainage, we collected sediment cores from two in-stream lakes that would have been affected and examined them for signals of catastrophic lake drainage.

Rethinking the Urban Cemetery: Land Use in Worcester**

Joseph G. Schlegel

Faculty Advisor: Douglas Kowalewski, Ph.D.

With increasing populations and death rates, burial spaces are being strained by the limited amount of space left in urban regions such as Worcester. In this project, I used Hope Cemetery in Worcester to evaluate spatially the evolution of cemetery use and placement as well as predict the lifespan of Hope Cemetery. The city's population, development, economic base, and perception of cemeteries as open space has changed, which has fueled the evolution of our concept of cemeteries. Included in this analysis are considerations of land use of surrounding areas that will affect the future expansion of Hope Cemetery as it reaches capacity. Initial results suggest that with the status quo for burial practices, Hope Cemetery will reach its maximum capacity in 2052. Incorporation of new ideas and alternative methods of burial is key to enhancing the capacity and longevity of Hope Cemetery and may stretch its lifespan to 2100.

PSYCHOLOGY

The Correlation Between Social Media Usage and Social Skills (A Cross Cultural View)

Sumayyah Allazzam

Faculty Advisor: Nicole Rosa, Ph.D.

This study looked at the effect of social media usage on young adults' social skills from a cross-cultural perspective. We conducted the study among American and Saudi Arabian young adults. Participants were asked to answer a survey that measured their social skills, self-esteem, academic performance, and overall psychological health. We hypothesized that young adults in both Saudi Arabia and the U.S. who use

social media more than the average student would be negatively affected, and their social skills, academic performance, self-esteem, and overall psychological health would be lower compared to average users. Results from this study will be presented.

Reducing Test Anxiety Contributed to High-Stakes MCAS Testing in Public Schools**

Kelsey Bedard, Grace Cook, Julie Dobachesky, Maura McPhillips, Nicole Putnam

Faculty Advisor: Kirby L. Wycoff, Psy.D., NCSP

The Massachusetts Comprehensive Assessment System (MCAS) is a high-stakes assessment that is completed on an annual basis by every public school student between the 3rd and 11th grade in the state of Massachusetts. These tests are mandatory by law in all Massachusetts public schools for graduation. The high-stakes testing contributes to copious amounts of stress for both students and teachers. The goal of this research project is to develop an anxiety reduction program for both students and teachers related to the stress around high-stakes tests in the state of Massachusetts.

Opposite Effects of Motion on Size Perception in the Ebbinghaus and Corridor Illusions

Kyle E. Cullen, Ryan E.B. Mruczek, Ph.D.

Faculty Advisor: Ryan E.B. Mruczek, Ph.D.

Studying visual illusions helps us uncover how sensory information is integrated into a subjective experience of the world. For example, size perception relies on the integration of multiple cues, such as retinal image size, perceived distance, and the size of nearby objects. Here we test the hypothesis that uncertainty in retinal image size will alter this integration process, and thus alter perceived size. Twenty WSU undergraduate students completed a psychophysical study in which they judged the size of circles while viewing the Ebbinghaus and corridor illusions under both static (two stationary circles) and dynamic (one moving circle) conditions. Compared to the matched static conditions, participants experienced stronger illusions for the dynamic Ebbinghaus and weaker illusions for the dynamic corridor. These data support our hypothesis in that the uncertainty of retinal image size alters the integration of multiple visual cues and thus affects our subjective visual experience of the world.

The Effect of Teaching Structure and Boredom Proneness on Metacomprehension and Compression

Taylor Boucher, Julia Anderson, Samantha Beaudry

Faculty Advisors: Emily Soltano, Ph.D., Nicole Rosa, Ph.D.

The tools that teachers use in class lectures, such as outlines and PowerPoint, and a student's proneness to boredom can influence comprehension and metacomprehension. The relationship between comprehension and metacomprehension acknowledges the gap between what students know and what they think they know. This study aimed to examine the extent to which boredom proneness and teaching structure affect comprehension and metacomprehension. Participants watched a video on financial planning and were provided with the following variables: an outline, PowerPoint, both an outline and PowerPoint, or no teaching tools; then they completed measures of boredom proneness, metacomprehension, and comprehension. Understanding the extent to which boredom proneness and a specific learning tool affects a student's ability to learn in a lecture setting will work to benefit both the student's knowledge and the teacher's ability to teach effectively.

Gendered Help-Seeking Among Male Students

Luke A. Gustavson

Faculty Advisor: Seth Sorgan, Ph.D.

Men do not typically seek medical or psychological help at the same rates as women, often choosing to ignore the problem or put off seeking help entirely. Six male undergraduate students between the ages of 20 and 47 ($M = 27.40$, $SD = 11.60$) of varying ethnicities and sexualities participated in two focus groups that were used to investigate the gendered aspects of psychological help-seeking among male university students. Grounded theory analysis revealed the connections between the participants' reasons for not seeking help and their discursive performance of both hegemonic and non-hegemonic forms of masculinity. Often, male students who endorsed hegemonic forms of masculinity did not seek help, minimized their problems, showed mistrust of health care professionals, and had poor or negative coping methods. Theoretical implications and directions for future research are discussed.

Cultural Capital Mediates the Relations Between Cognitions about Climate Change and Both General and Student Pro-Environmental Behaviors**

Alison Kahn, Robyn Lilly, David Erickson, Katelyn Dupont

Faculty Advisor: Champika K. Soysa, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

We studied cognitions about climate change, cultural capital, and pro-environmental behavior in students (N = 187). Cultural capital mediated the relationships between cognitions about climate change and pro-environmental behavior. Our findings could inform efforts to increase pro-environmental behavior in college students. (This poster also was presented in May 2015 at the Association for Psychological Science annual convention in New York City.)

Climate of Change: Psychological Determinants of Pro-Environmental Behaviors**

Alison Kahn, Champika K. Soysa, Ph.D.

Faculty Advisor: Champika K. Soysa, Ph.D.

Funded Source: Student Research, Scholarship, and Creative Activity Grant

We studied cognitions (beliefs and concerns) about climate change and cultural capital as determinants of pro-environmental behavior in students (N = 232). Further, we assessed cognitions about climate change as potential mediators of the relationship between cultural capital and pro-environmental behaviors, while controlling for broader environmental influences such as the uniqueness and harmony components of individualism and collectivism, respectively. Cultural capital, concerns about climate change, as well as the harmony component of collectivism determined both general and student pro-environmental behavior. In addition, concerns about climate change mediated the relationships between cultural capital and both general and student pro-environmental behavior. Beliefs about climate change mediated the relationship between cultural capital and student pro-environmental behavior. Our findings could inform efforts to increase pro-environmental behavior in college students. (This poster also was presented in March at the Eastern Psychological Association annual conference in New York City.)

Does University Experience Facilitate Ethical Thinking Among Students?++

Lola Kallasi, Cassidy Bradley, Charles Fox, Ph.D.

Faculty Advisor: Charles Fox, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

Earlier studies suggest significant differences in moral reasoning among participants who attended college and those who did not. The defining issues test (DIT), based upon Kohlberg's theory of moral reasoning, is a well-established measure of the level of moral reasoning. A review of 172 studies using the DIT suggests that development in moral reasoning does tend to improve during the college years and that specific collegiate contexts are associated with growth in moral judgment and moral behavior. To evaluate the effect of education at WSU on moral reasoning, we administered the online version of the DIT to 80 WSU students: 44 freshmen recruited from the Psychology Department subject pool and 36 seniors recruited from capstone courses. Results from this study suggested there were some differences between the two groups, but not those that we expected.

Perfectionist Dissatisfaction Mediates the Relation Between Locus of Control and Stress

Daniel Klein, Kaylee Leduc, Amy DeFrancesco, Samuel Lapoint, Champika K. Soysa, Ph.D.

Faculty Advisor: Champika K. Soysa, Ph.D.

Funding Source: WSU Faculty Mini-Grant

About 33 percent of undergraduates experience stress. We studied perfectionist high standards (adaptive) and dissatisfaction (maladaptive) as mediators of the relation between locus of control (LOC) and stress in 189 primarily first-generation college students. We established perfectionist dissatisfaction as a consistent mediator of the relations between three aspects of locus of control (internal, powerful others, and chance) and stress. Our findings could inform interventions that decrease perfectionist dissatisfaction as one way to lower levels of stress in undergraduates. (This poster also was presented in March at the Eastern Psychological Association annual conference in New York City.)

Examining the Combined Effects of Learning Strategies and Task Application on Knowledge and Interest

Samantha Maestro

Faculty Advisor: Colleen Sullivan, Ph.D.

A Commonwealth Honors Project

The purpose of the current 2x3 experimental study was to determine how the use of learning strategies and task application impacted knowledge and interest in a laboratory setting. Approximately 120 participants completed this study by listening to a presentation on an approach to relaxation through doodling, called Zentangle. Using random assignment, each participant was assigned to one of six possible conditions, which were based on interactions between learning strategies and task application. Participants' interests were assessed by survey methodology addressing situational interest and competence in using presented information in the future. Those who completed the task application had significantly higher levels of competence compared to those who did not apply the task. A multiple-choice test was used to determine knowledge gained from the presentation. Results concluded that there was no significant interaction or main effects on task knowledge.

Visual Comparison and Spatial Category Learning in Science⁺⁺

Katelyn Norsworthy

Faculty Advisor: Benjamin Jee, Ph.D.

Geological forces shape the Earth's crust. Normal faults form when forces pull blocks of rock apart along a plane. Reverse faults form when blocks of rock are compressed. Yet, normal and reverse faults may be difficult for novices to distinguish. This study investigated whether and how the similarity of visual examples affects learning. Highly similar contrasting examples may highlight spatial distinctions between normal and reverse faults. Thus, we predicted that comparison of visually similar examples would enhance learning. We conducted an experiment in which participants were presented with two fault images—one normal, and one reverse—embedded in a structural geology text. The images were either high or low in similarity. Participants then classified 22 new faults. Consistent with our prediction, participants who saw similar examples classified faults more accurately. Thus, visually similar contrasts may provide effective supports for concept learning. This finding can be broadly applied in the sciences.

Social-Cognitive Predictors of Student Pro-Environmental Behaviors⁺⁺

Champika K. Soysa, Ph.D., Alison Kahn, Katelyn Dupont, David Erickson, Robyn Lilly

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

We examined altruism, environmental attitudes, readiness to change, and cultural capital as predictors of pro-environmental behaviors (PEBs) among college students. In addition, we compared levels of readiness to change community action in terms of higher and lower cultural capital. Students with lower cultural capital reported greater pre-contemplation regarding community action compared to those with higher cultural capital, and students with higher cultural capital reported greater community action compared to those with lower cultural capital. Further, we found that altruism, environmental attitudes, community action, and cultural capital each added significant unique variance in determining student pro-environmental behavior. These findings could inform efforts to increase pro-environmental behaviors in college students. (This poster also was presented in August 2015 at the American Psychological Association annual convention in Toronto, Canada.)

Pro-Environmental Behavior: Contributions of Mindfulness, Altruism, and Cultural Capital⁺⁺

Champika K. Soysa, Ph.D., Alison Kahn, Daniel Klein, Amy DeFrancesco, Kaylee Leduc

Faculty Advisor: Champika K. Soysa, Ph.D.*Funding Source:* WSU Faculty Mini-Grant

We studied the Five Facet Model of mindfulness, altruism, and cultural capital, as contributors to general and student pro-environmental behaviors (PEBs) in 177 college students. Aspects of mindfulness, altruism, and cultural capital added significant unique variance in accounting for PEBs in hierarchical regression analyses. When examined together in the final step of the analyses, however, altruism and cultural capital contributed most of the variance in significantly, positively, accounting for PEBs. Our hypotheses were partially supported. (This poster also was presented in March at the Eastern Psychological Association annual conference in New York City.)

Models of Serenity in Undergraduates: Factor Structure, Stress, and Well-Being⁺⁺

Champika K. Soysa, Ph.D., Keith Lahikainen, Psy.D., Maria Parmely, Ph.D., Fang Zhang, Ph.D., Alison Kahn, Robyn Lilly, David Erickson, Katelyn Dupont

Faculty Advisors: Champika K. Soysa, Ph.D., Keith Lahikainen, Psy.D., Maria Parmely, Ph.D., Fang Zhang, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

We confirmed a three-factor structure in two models of serenity among college students (N = 263). Gladness (Model 1) and acceptance (Model 2) inversely predicted stress. Both faith and gladness (Model 1) and acceptance and inner haven (Model 2) positively predicted well-being. These findings could inform counseling center interventions with college students. (This poster also was presented in May 2015 at the Association for Psychological Science annual convention in New York City.)

FFM Mindfulness and Models of Serenity Differentially Predict Stress and Well-Being⁺⁺

Champika K. Soysa, Ph.D., Keith Lahikainen, Psy.D., Fang Zhang, Ph.D., Maria Parmely, Ph.D., Alison Kahn

Faculty Advisors: Champika K. Soysa, Ph.D., Keith Lahikainen, Psy.D., Maria Parmely, Ph.D., Fang Zhang, Ph.D.

Funding Source: Student Research, Scholarship, and Creative Activity Grant

Researchers have not studied Five Factor Model (FFM) mindfulness and serenity together to examine their unique capacity to determine stress and well-being. We studied FFM mindfulness and two models of serenity in college students (N = 263): mindful non-judging, non-reacting, and observing determined stress. For serenity, gladness (Model-1) and acceptance (Model-2) added unique variance in determining stress, in separate analyses. Mindful non-judging, non-reacting, and describing determined well-being. Faith and gladness (Model-1) and acceptance (Model-2) added unique variance in determining well-being, in separate analyses. These findings could inform counseling center interventions with college students. (This poster also was presented in August 2015 at the American Psychological Association annual convention in Toronto, Canada.)

The Walkability of Nature Trails

John Stranieri

Faculty Advisor: Brandi Silver, Ph.D.

Influences on walkability have been measured in urban environments, but not in natural environments. In addition, no research has been performed to investigate if other visual characteristics of the environment, such as brightness or terrain, have an influence on perceptions of walkability in the natural environment as they do in the urban environment. This study investigated whether brightness and terrain contributed to the perceived walkability of nature trails as well as whether or not a participant's outdoorsmanship affected perceived walkability of nature trails. The main effects of terrain and brightness on ratings of walkability were significant. The interactions between terrain and brightness, and between terrain, brightness, and outdoorsmanship, on ratings of walkability were also significant. Research regarding the benefits of walking has stimulated interest in developing environments which are more walkable. The most efficient way to design these environments is to determine how individuals make decisions about a route's walkability.

SCHOOL PSYCHOLOGY

Childhood Epilepsy*

Kendra Almstrom

Faculty Advisor: Diane Tighe Cooke, Ph.D.

The Epilepsy Foundation estimates that 300,000 children younger than age 15 have epilepsy. In the United States, the childhood prevalence rate is approximately 4 to 9 cases per 1,000. Epilepsy is a neurological condition characterized by recurrent seizures caused by clusters of nerve cells, or neurons, in the brain sometimes signaling abnormally and causing a person to have seizures. Epilepsy is one of the most common neurological disorders worldwide, affecting 50 million persons. This poster explains how children who have epilepsy need accommodations in school and that they would qualify under the neurological category through Individuals with Disabilities Education Act, which states that "the capacity of the nervous system is limited or impaired with difficulties exhibited in one or more of the following areas: the use of memory, the control and use of cognitive functioning, sensory and motor skills, speech, language, organizational skills, information processing, affect, social skills, or basic life functions."

The Neuropsychology of Autism Spectrum Disorders*

Ashley Cournoyer-Smith

Faculty Advisor: Diane Tighe Cooke, Ph.D.

This poster explains the neuropsychology of autism spectrum disorder. It examines the brain and behaviors most often associated with the disorder as well as provides medical and educational information to parents, educators, and others involved in the life of a child who meets the criteria for autism spectrum disorders.

The Neuropsychology of Trauma***

Victoria Dymereets

Faculty Advisor: Diane Tighe Cooke, Ph.D.

According to the National Association of School Psychologists, nearly 35 million children have experienced at least one event that could lead to childhood trauma (Child and Adolescent, 2012). About 72 percent of children and youth in the United States will have experienced at least one stressful event before the age of 18 (Deryck, Silver & Prause, 2014). This poster explains the ways the brain responds very differently to trauma, which depends on when a person experiences the trauma (early in life vs. adulthood) and the type of event. It also will show that this results in functioning capabilities varying greatly on a person-to-person basis. This poster describes symptoms, diseases, and the physiological changes that occur because of trauma. Mental health providers and teachers are becoming more aware of how traumatic stress can affect a child's brain development and thus the ability to learn and grow. This is especially important when one considers the statistics of how many children experience traumatic events that cause physical, mental, and emotional distress.

Documenting Mental and Behavioral Health Services: Lose the Three-Ring Binder

Victoria Dymereets, Amanda Fitzpatrick

Faculty Advisor: Denise R. Foley, Ed.D., NCSP

Funding Source: Student Research, Scholarship, and Creative Activity Grant

Schools have become adept at recording academic interventions; however, many experience difficulty in systematically recording pertinent information regarding history and intervention pertaining to behavioral and mental health problems. This poster describes how numerous schools from the same region are lacking systematic ways of capturing valuable information and data regarding students' behavioral and emotional health. Only a third of schools involved have standard systems for recording this type of information. What was initially a regional problem in a local school district led us to consider that this may be occurring on a larger scale, statewide, and possibly nationally. The presenters will share summaries of current and promising procedures and a sample tiered tracking sheet reflecting the best practice recommendations. (This poster was recently presented at the National Association of School Psychologists 2016 Annual Convention in New Orleans, Louisiana.)

How Executive Functioning Impacts Student Success*

Amanda Fitzpatrick, M.Ed.

Faculty Advisor: Diane Tighe Cooke, Ph.D.

Executive skills refer to the higher-level abilities that are required for humans to execute or perform tasks. People need executive skills to formulate even the most fundamental plan to initiate a task. Some people may refer to executive functioning as the "CEO" of the brain: the person in charge of making sure things get done, from the planning stages of the job to the final deadline. When there is a deficit in executive functioning skills, however, individuals may struggle with a variety of day-to-day tasks. The purpose of this poster presentation is to provide a comprehensive overview of the neurological development in executive functioning skills and identify the impact executive functioning deficits may have on a student's academic success.

Tourette's Syndrome and Neuropsychology*

Kelly Hasson

Faculty Advisor: Diane Tighe Cooke, Ph.D.

This poster examines Tourette's Syndrome (TS), a neurological disorder that affects 3 to 8 per 1,000 school-age children and has no known cure. The main symptom of this disorder is tics, which can be severe enough to interfere

with daily life activities such as employment, traveling, speaking, and attending to tasks. There is also a great deal of psychosocial distress associated with TS, which can lead to depression, social anxiety, and self-image and relationship problems. Currently, TS is treated with various pharmacological drugs and various types of therapy. Although most children diagnosed with TS have average intelligence, accommodations and modifications may need to be added to the curriculum in order for them to make effective progress. Some accommodations are centered around the environment, peer education, and presentation of assignments. Because there is no known cure for the disorder, it is highly important that those who are diagnosed are able to manage their symptoms appropriately so that it interferes as little as possible with their everyday life.

The Neuropsychology of Bipolar Disorder in Children*

Kristen Magerowski

Faculty Advisor: Diane Tighe Cooke, Ph.D.

This poster examines childhood bipolar disorder, which affects more than 750,000 children every year. Research indicates that psychiatric symptoms and behaviors evolve into bipolar disorder, which usually presents itself in two different ways: Bipolar I and Bipolar II. Children with bipolar disorder go through periods of mania and depression, and these episodes can be co-morbid with other common disorders, including but not limited to ADHD, anxiety disorder, and conduct disorder. Research has shown that children with bipolar disorder have structural abnormalities in many regions of the brain, and these abnormalities make it difficult for these children to function in the classroom. Bipolar disorder is considered a lifelong disease that cannot be cured, but the outcomes can be improved and managed. Medications and psychotherapy are common treatments for bipolar disorder in children, as well as accommodations in the classroom to improve their learning experience.

Juvenile Huntington's Disease: A Neuropsychological Perspective*

Elias McQuaid

Faculty Advisor: Diane Tighe Cooke, Ph.D.

Juvenile Huntington's Disease is an uncommon, often misunderstood genetic brain disorder that leads to abnormal movements, dementia, and behavioral disturbances that significantly affect many of our youth, either directly or indirectly. This poster is designed to provide clear, accurate information in an easily accessible format to educate viewers on the condition. The goal of this poster is to provide the viewer with an overview of Juvenile Huntington's Disease and how it differs from traditional Huntington's Disease with a focus on the neuropsychological aspects of the condition. The viewer will be provided with the neurological etiology, the symptoms, characteristics, how the disease is diagnosed, an overview of the medical problems and treatment, the legal issues and educational considerations, as well as a list of resources for those affected by the disease.

Attention Deficit Hyperactivity Disorder (ADHD): A Neuropsychological Perspective* **

Meghan St.Denis

Faculty Advisor: Diane Tighe Cooke, Ph.D.

Attention Deficit Hyperactivity Disorder (ADHD) is the most commonly diagnosed childhood neurobehavioral disorder. As a parent with a child exhibiting attention deficit or hyperactivity symptoms, it can be very frustrating to not have all the facts. Having information about ADHD from a neuropsychological perspective can be helpful in finding the right diagnosis and potentially the correct treatment. This poster will thoroughly define ADHD along with its identified causes, legal implications, assessment reviews, and treatment options. There are also school-related ADHD concerns as well as different websites, support groups, and other resources parents may wish to review if they feel they need more help. The purpose of this ADHD presentation is to look at ADHD in a different perspective rather than a medical viewpoint. Different viewpoints allow for a more thorough investigation of symptoms and give parents the peace of mind that they are getting the most extensive information possible when investigating a possible ADHD diagnosis for their child.

SOCIOLOGY

WSU Civic Corps⁺⁺

Jeannece Baptiste, Leanna Borges, Katherine Camas, Wander Cristian, Geovani Cruz, Lancy Desir, Jose Medina, Melinda Mercedes, Maria Munoz, Kiahtay Nuahn, Kenia Ramirez, Amber Suarez, Rachel Gonzalez Santiago, Nhi Tran, Aldo V. Garcia Guevara, Ph.D., Katey Palumbo, Sebastian Velez, Ph.D., Mark Wagner

Faculty Advisor: Aldo V. Garcia Guevara, Ph.D.

Funding Source: SPIF Funds

This poster will be an interim report on the WSU Civic Corps Project. By recruiting sophomore-level African, Latino, Asian, and Native American (ALANA) students into a "Civic Corps," we can increase student access to global service-learning, develop their skills and knowledge, and improve the overall level and quality of civic engagement on the Worcester State campus. Our desired outcome was achieved and we recruited 14 ALANA students (12 sophomores and two seniors), each of whom will be given \$1,000 and participate in one to three projects.

URBAN STUDIES

HOT Team Working to Stop Unfair Food Stamp Termination

Kathleen Collins, Judith Knight

Faculty Advisor: Maureen E. Power, Ph.D.

Funding Source: WSU Intergenerational Urban Institute

This poster will explain how the Hunger Outreach Team (HOT) of the Intergenerational Urban Institute continues to help fight hunger in the community and in our own student population by assisting people with Supplemental Nutrition Assistance Program (SNAP) applications and appeals. Recently, new time limits for ABAWD's (Able-Bodied Adults Without Dependents) went back into effect January 1, 2016, in Massachusetts, which was a federal law that was suspended for many years. Individuals considered ABAWDs may only receive SNAP benefits for a total of three full months within a 36-month period unless the person meets an exemption or complies with certain work requirements. HOT is helping students understand the new law and assisting them in finding ways to meet the new criteria. The poster also will describe how the team is working closely with the Massachusetts Law Reform Institute in applying for student appeals.

Making the Garden for All Ages Accessible to All

Todd Miller

Faculty Advisor: Maureen E. Power, Ph.D.

Funding Source: WSU Intergenerational Urban Institute

The Intergenerational Urban Institute's "Garden for All Ages" has created a thriving garden with 39 raised beds for vegetables and an extensive flower garden. This teaching garden involves the students of neighboring Chandler Magnet School and the residents of Bet Shalom. However, this garden is not yet accessible to "all" because of the rough terrain of its pathways. This project involves developing a plan for ADA-compliant walkways. Inclusive design strategies and material selections are central to providing full accommodations to those with reduced walking capabilities, wheelchair access requirements, and stable walking surfaces. The project entails designing and researching appropriate materials and grant opportunities to create new pathways that will make the garden a destination for people of all abilities.

Stress, Stigma, Shame, and Support: The Abortion Experience for Women in the U.S.^{**}

Brianna Novicki

Faculty Advisor: Thomas Conroy, Ph.D.

The main focus of this research is to look at stress before and after having an abortion; stigma surrounding abortion; and support for women before, during, and after an abortion. Stress before an abortion, or lack of stress, includes seeing the ultrasound, effects of protesters, pre-abortion counseling and waiting period laws, paying for the abortion, and abortion stigma. Despite being legal and a normal experience, abortion is still highly stigmatized in the United States. Overall, there is a lack of support for women, especially post-abortion. This is partly due to the fact that stigma can shame women so deeply that they feel that they need to be silent about their experiences and do not seek out support.

Robbed of Choice: The Commercial Sexual Exploitation of Children in the United States of America**

Emily L. White

Faculty Advisor: Thomas Conroy, Ph.D.

The commercial sexual exploitation of children is a prevalent, dark underbelly of American society. The concepts of autonomy and personal agency are not always upheld in North America. Childhoods are stolen through the actions of pimps and “johns” as demand perpetuates the need for a steady supply. Who is it that is being targeted by the pimps and traffickers, and how are pimps luring girls into this way of life? Where are victims being trafficked to, and how is this taking place? Technological advancements have furthered the number of venues where a child is trafficked. Acknowledging and understanding the reality is essential for preventative action to be put in place. The purpose of this research is to challenge current perception, to highlight the need for serious research on this topic, and to present a call to action.

VISUAL AND PERFORMING ARTS

Internships at the Worcester Art Museum: A Collaborative Project of Visual and Performing Arts and Communication****

Ryan Jarvis

Faculty Advisors: Julian Berrian, Catherine Wilcox-Titus, Ph.D.

Funding Source: Worcester Art Museum and Worcester State University Collaborative

“Internships at the Worcester Art Museum” will showcase the joint effort between the Visual & Performing Arts and Communication Departments to document the creative journey of four student interns working at the Worcester Art Museum (WAM) during the spring semester of 2015. Professors Julian Berrian and Catherine Wilcox-Titus will describe the internships the students had working with WAM Director Emeritus Dr. Jim Welu. Students were tasked with giving talks in front of chosen artworks, which were then videotaped by communication professor Julian Berrian. We will show an excerpt of the talk given by Ryan Jarvis, a former WAM intern, in front of the painting “The Hull” by the artist Hyman Bloom. We will also show video excerpts of the students facilitating the activities that they devised for the art carts that were placed in specific galleries at the museum. Ryan will close the panel by speaking about his experience at the WAM with Dr. Jim Welu.

The Marvelous Dissection of the [hu]Man**

Kristine MacBrian

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

Funding Source: Student Research, Scholarship, and Creative Activity Grant

A series of photographic self-transformations that document my investigation of gender performative identities will be presented. Through digital photographic manipulation, literal and figurative complexity into the “black and white” normative framing of gender will be introduced. In using older formats such as classic Polaroid photographs, I will urge the viewer to move away from the initial intended purpose of the family photo and update the content for the millennial “selfie” generation. (The series, along with works of WSU alumnus Justin Sliwoski, will be exhibited at the Sprinkler Factory in Worcester this month.)

Compositions by WSU Students**

Spring 2016 Composition Course Students

Faculty Advisor: Kyle Martin

Recordings of music composed by students will be played from a laptop computer.

Theme Semester Recognition Celebration and Spring 2017 Theme Announcement****

Sam O’Connell, Ph.D.

This event is a recognition of the projects that partnered with Theme Semester’s Spring 2016 theme, “Seeing/ Believing: Evidence, Perception, and Interpretation.” This event will also include the formal announcement of next year’s theme.

Black Mountain College: 20th-Century Experiment, 21st-Century Resonance****

Pamella Saffer

Faculty Advisors: Lisa Kramer, Kyle Martin, Catherine Wilcox-Titus, Ph.D.

In September 1933, Black Mountain College near Asheville, North Carolina, opened the doors to its first class. During the 23 years it remained in operation, it attracted a roster of faculty and students that reads like a Who's Who of the most influential creative minds of the 20th century. Whether they stayed for a month, a summer, or years, they became the shakers, the movers, and the innovators of 20th-century arts. It was an American phenomenon: an educational experiment in community learning and living and a driving force in interdisciplinary arts. Pioneering southern desegregation, the institution's African-American faculty and students lived and worked alongside white colleagues 10 years before *Brown v. Board of Education*. This presentation will look at the events that led to the founding of Black Mountain College, examine its philosophical grounding, review some of the work produced there, and make connections to my own work.

WORLD LANGUAGES

Challenges of Directing *Abrir el Ojo*

Kelly Bosselman, Cassandra Goncalves, Natasha Gonzalez

Faculty Advisor: Antonio Guijarro-Donadiós, Ph.D.

We investigated the challenges that a director of a 17th-century play may have faced, such as theatrical spaces, costumes, lighting, backgrounds, and props. It was difficult to write a play with multiple settings; this led to the majority of scenes taking place offstage with the audience only hearing sound effects. Also, because of these challenges, many plays would only have one central story, and secondary plots would be linked to it. It was also difficult to direct a play if it had scenes that took place in more than one day, because plays had to be performed during daylight hours due to the lack of electricity. *Abrir el Ojo* is a comedy from the 17th century whose initial purpose was to keep watchers entertained yet interested in what the play was about. It was directed in 1645, and over time it came to be viewed as a grand comedy.

Translation From English to Spanish of Public Health Brochures

Glennys Fuentes, Madeline Parsons

Faculty Advisor: Antonio Guijarro-Donadiós, Ph.D.*Funding Source:* Undergraduate Summer Research Fund

As the Spanish-speaking population in Worcester continues to grow, it has become of the utmost importance to ensure that these people have whatever information necessary available to them. The Psychology Department at WSU had created brochures regarding public health with the goal to make this information useful and understandable for people who speak Spanish in the city. Thanks to the translation course SP-327 taught by Dr. Guijarro-Donadiós, we were able to acquire the skills needed for translating. This poster will show the original English brochure and the one translated into Spanish and describe the method used to achieve the proper translation.

Spanish Golden Age Theater

Beatriz Jimenez, Merrie Gardner, Kara Hussey

Faculty Advisor: Antonio Guijarro-Donadiós, Ph.D.

Performing arts and theater are just some of the defining factors that contributed to the flourishing culture of Spain's Golden Age. Writers such as Lope de Vega, Tirso de Molina, and Pedro Calderón de la Barca dedicated their life's work to creating this crucial moment in the 16th century. Producing such extensive works live on the stage, however, proved to be difficult with the limited resources of the time. Our research explores the complications of staging and performing the Golden Age play *Los Locos de Valencia* by Lope de Vega.

Celebration of Scholarship and Creativity

Departmental Liaisons

Biology	Ellen Fynan and Randy Tracy
Business Administration and Economics	Jay Mahoney
Chemistry	Joe Quattrucci
Communication	Dan Hunt
Communication Sciences and Disorders	Sharon Antonucci and Suzanne Meyer
Computer Science	Elena Braynova
Criminal Justice.....	Hye-Sun Kim
Physical and Earth Sciences	Bill Hansen
Education.....	Kirby Wycoff
English	Heather Treseler
Health Sciences	Mariana Calle
History and Political Science.....	Martin Fromm
Mathematics.....	Michael Winders
Nursing.....	Stephanie Chalupka
Occupational Therapy.....	Joanne Gallagher
Philosophy	Elena Cuffari
Psychology	Charlie Fox
Sociology.....	Francisco Vivoni
Urban Studies	Madeline Campbell and Tim Murphy
Visual and Performing Arts	Stacey Parker
World Languages.....	Antonio Guijarro-Donadiós



Celebration of Scholarship and Creativity Event Contributors

Jillian Anderson

Kim Caisse

Melissa Fleming

Dean Jane Friederichs

Christine Hickman

Dean Roberta Kyle

Mark LaCroix

Dean Linda Larrivee

Renae Lias Claffey

Lisa McCormack

Gerald Sorge, Lead

Denise Thomas



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