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2022

Abstract Book

Friday, November 11, 2022

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Ethel Smyth: A Passionate & Prolific Life

Rhiannon Baasch

Institution: **Viterbo University**

Faculty Mentor: ***Mary Ellen Haupert***
Discipline: ***Music***
Co-author*:* ***Mary Ellen Haupert***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

When it comes to music history, the works and composers that we remember and most often perform tend to be written by white, Western European men. However, women and people of color have been writing and performing music for centuries. In recent years, music educators have been making strides to include these often forgotten composers in classroom discussions. One of these composers is Dame Ethel Smyth—a British composer and suffragette who helped make strides for women both within and outside of the field of music. During her lifetime, Smyth played an instrumental role in helping women to gain the right to vote in England. As a composer, she achieved a great many "firsts" for a woman in the field of music—including being the first woman to have one of her operas performed at the Metropolitan Opera in New York. She was acquainted with some of the most famous composers of her time, including Johannes Brahms and Tchaikovsky, who encouraged, helped, and inspired her as a musician. Despite the backlash she faced as a woman in the field of music, she refused to be discouraged and, through her dedication to her music, managed to change the minds of some of her critics. Renewed focus on celebrating the works for less mainstream composers means that Smyth's works have recently come back into the light and are being increasingly programed for performances around the world. However, there is still much work to be done in order to give Smyth and composers like her the recognition they deserve.

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Determining the Rate Constant for Hydrogen abstraction from Water by p-fluorophenyl radicals

Autumn Barloon

Institution: **Winona State University**

Faculty Mentor: ***Dr. Thomas Nalli***
Discipline: ***Organic Chemistry***

Presentation Type: ***Poster Presentation***

Abstract:

Highly reactive oxygen species (hROS) cause oxidative stress that can lead to diseases such as cancer and cardiovascular diseases. This research explored one of the ways these species can be made in the body; through abstraction of hydrogen from water by phenyl radicals. The phenyl radicals can enter the body through medications such as benzoyl peroxide, which is commonly used to treat acne making this research of relevance in the medical community. In this research, p-fluorophenyl radicals (FPh) were generated from p-fluorophenylazoisobutyronitrile (FPAIN) by visible photolysis in the presence of varying amounts of water and 3-iodobenzotrifluoride (ArI). The p-fluorophenyl radicals competitively react with water to form fluorobenzene (FPhH) and with 3-iodobenzotrifluoride to form 4-fluoroiodobenzene (FPhI). The yield ratios of the products [FPhH]/[FPhI] can then be measured by integration of their 19F NMR peaks and plotted versus the reactant concentration ratios, [H2O]/[ArI] to give a linear correlation, the slope of which corresponds to the relative rate constant, kH/kI = 0.0192. The rate constant for iodine abstraction from ArI (K_I=2.2x10^8 M-1 s-1) is known so the experimentally determined slope allows the determination of the rate constant for hydrogen abstraction from water (K_H=7.5x10^6 M-1 s-1).

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Effect ofEnvironment on BDNF Induced Plasticity of Chronically Stressed Rats

Alexander Boardman

Institution: **Viterbo University**

Faculty Mentor: ***Charlie Lawrence***
Discipline: ***Biology and Neurology***
Co-authors: **Mira Kendall and Alisha Lozenski**

Presentation Type: ***Poster Presentation***

Abstract:

Disorders such as Depression and Anxiety have been shown to be directly linked to stress in the brain and the effects of chronic stress and how it sets the stage for depression and anxiety to start due to the lack of maintenance of the neurons allowing for it to progress. Specifically, the lack of being able to reorganize the neuron has been shown to allow for these disorders to develop quicker. It has been shown that this is linked to the lack of a protein produced in the brain called, brain derived neurotropic factor (BDNF). BDNF is a growth factor that is used by the cell's dendrites to enhance the survival of the Neuron cells. (Bathina and Das 1164-1178) The use of BDNF in both developmental treatments and therapy have been thoroughly documented and used from general inflammation to type 2 diabetes and general neurological disorders. BDNF in particular is very clinically important due to its large signaling cascades where a single action leads to hundreds of others such as how BDNF is attributed with making the neuron have more malleable plasticity. Its use in treatment is well known overall but its use in development isn't. We set up two populations of rat's in enriched and standard environments that were both under the same stressors, and then examined the BDNF levels in their prefrontal cortex and their hippocampus via a western blot. (More than 20 Blots) We were only able to detect BDNF once due to the nature of western blots, and due to this have started to set up a robust framework for western analysis of rat BDNF.

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Approximate Determinants of COVID-19 Vaccination Among College Students

Natalie Brown

Institution: **University of Wisconsin-Eau Claire**

Faculty Mentor: ***Jianjun Ji***
Discipline: ***Sociology***
Co-author: ***Jianjun Ji***

Presentation Type: ***Poster Presentation***

Abstract:

Based on a Qualtrics survey distributed to students on a college campus, this study is to investigate the approximate determinants of the COVID-19 attitudes and behaviors. Provided by the survey sample size of 387 from the University of Wisconsin-Eau Claire (UWEC), we developed the research hypotheses that the attitudes towards COVID-19 by UWEC students are associated with their demographic characteristics such as age and gender, with their socioeconomic status such as social class and financial status, with their political background, as well as their social-environmental factors such as regions, religions, parents, and their educational attainments. By utilizing statistical methods of Chi-square significance test, Pearson's correlation, and multiple linear regression Analysis, the findings are largely showing support to our underlining hypotheses.

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Analysis of Mercury methylation in the Black River with Respect to geographic relation to a Wetland ecosystem and water level Fluctuations

Calvin Brown

Institution: **Viterbo University**

Faculty Mentor: ***Kristopher Rolfhus, Kyle Backstrand, Michael Alfieri***
Discipline: ***Biochemistry***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

The presence of harmful elements, notably mercury (Hg), in Wisconsin waters is a widespread problem because it can lead to health problems associated with bioaccumulation, in people and animals that live in and around contaminated water (Wiener et al., 2002). The Black River was chosen as the study site because the Wisconsin DNR has issued mercury advisories for fish. Studies have indicated that wetlands, as well as fluctuations in water levels, can result in increased methylmercury present in aquatic environments. Unfiltered grab samples were obtained on multiple days preceding a rain event in the summer of 2022 and then on subsequent days following a rainstorm. These samples were collected both upstream and downstream of a wetland to analyze its effects on methylation. Dissolved Oxygen and pH were also measured at the sampling times to analyze if they correlate with methylation as well. Samples were analyzed for total mercury concentrations through oxidation, purge and trap, and cold-vapor atomic fluorescence spectroscopy and methylmercury was analyzed through distillation, aqueous ethylation, purge and trap, and cold-vapor atomic fluorescence spectroscopy. The concentrations of both total mercury and methylmercury were higher at the upstream sampling location than the downstream location. The proportion of methylmercury to total mercury was greater at the downstream location but did not prove to be significant. There was not a significant relationship in the concentrations of the mercury species with water level fluctuations. These findings indicate that the wetland that was researched may not possess the qualities that result in increased methylation and/or there may be hydrological factors that influence the mobility of mercury in the river. A study in the same location analyzing a more intense rainstorm than the one involved in this study may reveal different results.

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Levels of Digital Health Literacy in College Students and their Implications

Cheyenne Carlsen

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Molly O'Connor***
Discipline: ***Psychology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Digital Health Literacy (DHL), the ability to recognize the reliability and validity of health sources online (Dunn & Hazzard, 2019), is an important skill for individuals to have, especially in today's age of technology. There is an overwhelming amount of information online so having the ability to sort through it is crucial for maintaining good health and health practices. College students, though they are receiving post-secondary education, have been shown to be lacking in their DHL abilities (James et al., 2020). This study aims to measure these levels in college students and determine if teaching individuals how to find reliable health information online has an impact on student's ability to decipher good sites from those that shouldn't be used to obtain information. This study will consist of participants watching two videos and then visiting websites to determine their reliability and validity (accuracy). Answers will be evaluated and scores will be assigned to participants. This study is currently in the data analysis phase.

LGBTQ Parents of Special needs kids

Angelica (Angel) Carter

Institution: **Viterbo University**

Faculty Mentor: ***Andrew Hamilton***
Discipline: ***Ethics, Culture, and Society***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

My research consisted of looking at how LGBTQ parents of special needs kids are treated by society and disability services. I found several scholarly articles explaining those scenarios. LGBTQ parents and parents of special needs children are both small groups within the broader group of parents of children. Both of those small groups are important to me so I thought to look at the even smaller group that consisted of both of those qualities. I learned that they are treated very unfairly in almost every way. My solution to my findings is not one that I myself can make as I am not going into disability services.

Filipino Culture's Perspective on Addressing Mental Health Through a Nurse's Lens

Tess Durscher

Institution: **Viterbo University**

Faculty Mentor: ***Kerri Busteed***
Discipline: ***Nursing***

Presentation Type: ***Poster Presentation***

Abstract:

Mental health is a growingly common and serious issue that is prevalent in every culture across the globe. However, the stigma around it is more pronounced in certain cultures compared to others. By a certain culture not accepting the severity of mental concerns and their validity being equal to physical health concerns, there is a barrier created in the willingness for an individual to seek treatment. Among the Filipino population, there is a sense of shame in an individual addressing mental health concerns. Due to the shortage of attention towards mental health in their culture, individuals commonly do not seek treatment because of fear of rejection from their family and community members. A qualitative ethnographic study was done by research, immersion, interviewing, and observation in Western Visayas Medical Center to better understand how mental health is addressed in their healthcare facilities, primarily emergency rooms. Upon admission of a suspected mental health concern, therapeutic communication is utilized for the assessment and patient is observed for four hours upon arrival to ER to determine if admission is needed. There is common difficulty for the nurses to diagnose and treat the patient due to family members not disclosing the entire situation. With few specialized psychiatric facilities accessible, there is trouble in finding adequate care for common disorders of anxiety, schizophrenia, and bipolar. Inaccessibility of mental health resources causes delay in care that leads to worsening of disorders. Despite family members and significant others playing a primary role in care, it is common for them to create a barrier in mental healthcare for the patient.

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The Feasibility of Growing and Selling Herbs to the Viterbo Campus Cafeteria

Sharice Elbert

Institution: **Viterbo University**

Faculty Mentor: ***Tiffany Lein***
Discipline: ***Biology***
Co-author: ***Samantha Schnick***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

This research project focused on the feasibility of nutrition students growing fresh herbs and lettuce varieties from the hydroponics vertical growing system that we have in our nutrition department and selling the product to the Viterbo cafeteria. Currently students get to experience growing and harvesting a variety of produce in class as curriculum, but then begin to question what will be done with it. By collaborating with our mentor and the foodservice director at Viterbo, a new idea of what to do with the produce arose. For this project we completed one growing rotation of fresh herbs and lettuce varieties through the hydroponics system. To compare the two options we priced out the cost of supplies needed to grow herbs in the hydroponics system, such as rockwool, which is the growing medium used, as well as seeds and growing nutrients. There was a cost analysis and comparison completed to determine the cost of fresh produce per ounce being purchased from a vendor of choice by the cafeteria versus the cost of growing from the hydroponics system. From our results, it was determined that the harvest yielded from one hydroponics growing system does not provide a significant profit or amount of produce to sustain a partnership with the Viterbo Cafeteria. In the future, we plan to use the hydroponics system to grow fresh produce for our nutrition courses to utilize during food labs.

Olmesartan and Captopril's Promising Potential in Diminishing Fibrotic Activity of Radiation Induced Pulmonary Myofibroblasts

Easton Halverson

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Susanna Driscoll***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

Radiation induced pulmonary fibrosis (RIPF) is an irreversible and progressive lung disorder characterized by abnormal myofibroblast activity. Myofibroblasts make collagen fibers, which normally help repair tissue damage, but excess collagen can make tissues stiff and less functional. Excess collagen, also called "fibrosis" in the lungs causes chronic shortness of breath and decreased oxygenation. For reasons not completely understood, radiation injury seems to trigger the terminal conversion from fibroblasts to myofibroblasts. Radiation induced reactive oxygen species (ROS) production likely plays a role in this irreversible conversion. Recent animal studies have shown the angiotensin converting enzyme inhibitor (ACE-I), Captopril prevents or lessens radiation induced lung injury. However, the way in which Captopril diminishes radiation injury is unknown. The objective of this research was to determine if Captopril and Olmesartan (an angiotensin receptor blocker) can diminish fibrotic activity of radiation induced myofibroblasts, as would be suggested by decreased collagen type I and reactive oxygen species (ROS) production in cultured fibroblasts. Olmesartan and Captopril are both well tolerated medications, FDA approved to treat high blood pressure. Collagen expression in various experimental and control groups was quantified using qPCR, with inconclusive results because of technical difficulties. This research also analyzed the presence of ROS production in irradiated cells with and without Captopril treatment. The data suggests that ROS production was decreased in irradiated cells that were treated with Captopril. Further in vitro research (utilizing the recently developed protocols) will be essential in understanding the promising potential that both ACE's and ARB's have to diminish fibrotic activity of radiation induced pulmonary myofibroblasts.

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Analysis of keto-enol tautomerization and light sensitivity of several synthetic curcuminoids using 1D and 2D NMR spectroscopy

Miryah Henriksen

Institution: **University of Wisconsin-La Crosse**

Faculty Mentor: ***Dr. Valeria Stepanova***
Discipline: ***Organic Chemistry/Spectroscopy***

Presentation Type: ***Poster Presentation***

Abstract:

Curcumin (CUR) is the principal active ingredient in turmeric. It is known for its anti-infective and anti-inflammatory properties. Despite the benefits, low water solubility and chemical instability in solution pose serious limitations to potential pharmaceutical applications of CUR. Turmeric also contains an asymmetric analog of CUR known as demethoxycurcumin (DMC) that demonstrated higher biological potential for cancer-based and non-cancerous diseases, in addition to improved solubility and stability. Analogs of DMC and CUR, known as curcuminoids, can be obtained only through synthesis. However, while their chemical structures could be identified their behavior in solutions, particularly those containing water, is unknown. Each curcuminoid, including CUR and DMC, can exist in keto or enol form that are exchangeable through the process known as tautomerization. The difference in conjugation of two forms of a compound are substantial and could be related to the stability and biological properties. In addition, information on the impact of water on the tautomerization process has not been extensively studied in the literature despite the importance of that knowledge for biological applications. An additional application of curcuminoids is their potential use for the disinfection of food surfaces when combined with UV-A light. However, stability of each compound must be verified prior to biological testing. In this study, we have investigated a variety of asymmetric curcuminoids previously synthesized and characterized in our group. We have utilized the method using nuclear magnetic resonance (NMR) spectroscopy that was previously applied in our report on the impact of water on tautomerization process for a symmetric analog of CUR bisdemethoxycurcumin (BDMC). The results of this study provide beneficial information for further practical applications of curcuminoids.

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Intermittent Fasting and Metabolic Effects

Brianna Houle

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Maria Morgan-Bathke***
Discipline: ***Nutrition***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Does time really matter in regard to fasting? Intermittent fasting has gained popularity as a means of a dietary interventions, and results in no adverse health effects with both animal models and human participants. This indicates that intermittent fasting, otherwise known as IF, has the ability to produce positive metabolic changes within human composition such as decreased blood pressure, decreased body mass index, and decreased levels of cholesterol. This study investigated metabolic effects of intermittent fasting such as blood pressure, cholesterol, and body mass index among two fasting intervals of 12:12 and 16:8 plus a control group. All participants were recruited from the Viterbo community; all reported ages were between 19 and 62. The study was conducted over a course of a 12-week period with no caloric constriction but simply timed fasting guidelines. Participants were instructed to adhere to their assigned fasting interval and could do so within regard to their circadian rhythm. After running both a pairwise t test and a one-way Anova, it was determined that there was no significant difference between 12:12 and 16:08 fasting groups in regard to metabolic effects. Both groups did show a decrease in blood pressure, body mass index, and some levels of cholesterol – indicating that intermittent fasting has in fact produced positive changes within human composition, but the timing of fasting intervals does not play a significant role.

The Relationship Between Musical Mnemonics, Tune Familiarity, and Memory Performance

Grace Howard

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Molly O'Connor***
Discipline: ***Psychology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Musical mnemonics, or memory devices that utilize music, are often used to help children learn or memorize information (e.x. the alphabet or the fifty states). Common populations for music-related research include children and elderly people, so much of the existing literature on musical mnemonics is in those populations, although some have suggested anecdotally that musical mnemonics could be used to help older students study and memorize information as well. Some researchers have studied familiarity of music as background to memory tasks (Chew et al., 2016). This study is intended to examine the efficacy of musical mnemonics while also looking specifically at the relevance of tune familiarity within the mnemonic, similar to a study conducted by Moussard et al. (2014). For this study, I created videos which played the audio of a 15-word list for all conditions, including musical and the non-musical control, to show participants during in-person data collection. Each participant was randomly assigned to one of the conditions in the study. I am currently in the process of data collection.

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Beneficial effects of losartan in a fruit fly model of Emery Dreifuss muscular dystrophy

Kemi Katemboh

Institution: **Waldorf University**

Faculty Mentor: ***Dr. Gary Coombs***
Discipline: ***Biology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Muscular dystrophy is an inherited disease characterized by muscle weakness and atrophy. In children, symptoms include clumsy movement, difficulty climbing stairs, leg pain, and difficulty in jumping or hopping. In the United States, approximately 235,000 individuals are affected by muscular dystrophy (all types). The median survival rate of patients born after 1990 who are affected by muscular dystrophy is 28.1 years. Emery-Dreifuss muscular dystrophy is a group of rare, inherited myopathies that cause weakness and atrophy in a child's shoulders, upper arms and calves. EDMD is caused by various mutations in the LMNA gene, which encodes the proteins lamin A and Lamin C. Losartan is an angiotensin II type I receptor blocker that is associated with improvement in muscle strength and amelioration of fibrosis. Losartan is commonly used for hypertension but in recent years, mouse models have shown that the drug can achieve clinical improvement in muscle strength, and ameliorate fibrosis. Recent studies of Losartan have shown that it inhibits TGF-b and MAPK signaling. Both of these pathways have been implicated in an inefficient chronic healing process that promotes fibrosis in muscle. I have used fruit flies expressing mutant forms of Lamin C to model Emery Dreifuss muscular dystrophy. In this model, I have quantitated the effects of losartan on larval locomotion on an agar surface, and survival of pupation to successful eclosure.

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Accumulation of lysosomes and lipids in the brain with aging: a risk factor for Alzheimer's disease?

Kemi Katemboh

Institution: **Waldorf University**

Faculty Mentor: ***Dr. Leon Coleman Jr.***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

Alzheimer's disease is a progressive disease that destroys memory and other important mental functions. It is currently the most common form of neurodegenerative dementia in the United States. The risk factors for Alzheimer's disease include age, alcohol, obesity, cardiovascular diseases, family history and a history of head trauma. After the age of 65, the risk of Alzheimer's disease doubles every 5 years. Alzheimer's disease is caused by the buildup of Amyloid beta plaques and neurofibrillary tau tangles in and around the brain cells. The goal of this project was to determine if lysosomal number and lipids in neuronal lysosomes increases with aging. The model organism that I used for my research project were male mice cortexes. I performed western blots to quantify the increase in lipids with normal autophagy with aging. I ran qRT-PCR on lipid metabolism regulators to compare mRNA gene expression in mice with aging. I performed immunohistochemistry to quantify age associated increase in lipids in the frontal cortex. Based on my results, I found that there was a significant increase in lipid area in the frontal cortex with aging. There was a significant increase in lysosomes with normal cellular autophagy with aging.

Environmental Enrichment May Combat the Adverse Effects of Chronic Stress

Mira Kendall

Institution: **Viterbo University**

Faculty Mentor: ***Charlie Lawrence***
Discipline: ***Neuroscience***
Co-author *:* ***Alisha Lozenski***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Plasticity refers to the ability of the brain to change and develop over time by altering or creating synapses in response to changing stimuli. Over the course of an organism's life, synapses are constantly changing as an individual's surroundings change. Prior research demonstrates that there are many factors, including chronic stress, that can suppress these new synapses from forming, restricting plasticity. Is this process reversible or preventable? In this study, 32 adolescent rats were divided into two groups that differed based on the environment. The standard group (n=16, 10 male and 6 female) was housed in a shoebox cage with one other subject, provided only the necessities of food, water, and bedding. The enriched group (n=16, 6 male and 10 female) was divided into cages two times the size of those in the standard group, with three to four rats residing in each cage; in addition to the necessities of food, water, and bedding, the enriched cages also included toys (wooden blocks, cardboard, bells, wheels). Rats were randomly assigned to either the standard or enriched group. To examine the potential effects of enrichment on stress response and resiliency, we utilized several behavioral tests over the span of six and a half weeks. Overall, the results of this study indicate that there may be a slight correlation between environment and stress response. The enriched test subjects exhibited behaviors including increased socialization tendencies and more observable curiosity. The basic test subjects were noticeably more timid, less consistent, and less interested in social interactions. Due to a limited sample size, the results are statistically inconclusive. These results on a broader scale could be used to indicate that young children who live in unhealthy and non supporting environments may be at a cognitive disadvantage in terms of reacting to chronic stress.

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East To West Geographical Variation of Ultrasonic Vocalizations in Southern Flying Squirrels

Philip Kostecka

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Benjamin Pauli***
Discipline: ***Biology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Communication serves an important role in the lives of many animals and has a wide variety of purposes. Interactions involving communication are diverse, such as prey acquisition, alarm calls, and mating rituals. One form of communication used in animal species is ultrasound. Ultrasonic sounds are frequencies above 20 kHz. Ultrasound vocalization (USV) have long been studied in bats but research in other mammals is still in its infancy. Variation in vocalizations is also an interest to ecologists and has been observed in several rodent species. A recent animal of interest for USVs has been flying squirrels. Recent studies on the southern flying squirrel, Glaucomys volans, have focused on collecting ultrasonic calls, and characterizing the full repertoire of vocalizations. Research has shown variation in their call repertoires on a north to south gradient. The goal of this study was to identify if there is variation in the ultrasonic vocalizations of G. volans on an east to west geographical gradient by capturing and recording southern flying squirrels near the western edge of their geographic range. Unfortunately, in this study, no flying squirrels were captured, only species of Peromyscus and Tamias striatus were captured and provided a sense of the community in the locations utilized. If a future study were to be successful, the significance of this research on variation in USVs can be useful for understanding the evolution of ultrasound in gliding mammals, detection of species in a habitat, and new information into the social, reproductive, and feeding ecology of animals that use ultrasound, as well as the possibility of evidence of variation in USVs of southern flying squirrels on the east to west gradient.

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Effects of Apple Cider Vinegar on Body composition, Cholesterol, and Blood glucose levels

Danielle Lindholm

Institution: **University of Wisconsin- La Crosse**

Faculty Mentor: ***Dr. Karen Skemp***
Discipline: ***Nutrition***

Presentation Type: ***Poster Presentation***

Abstract:

The purpose of this study was to better understand the effects of Apple Cider Vinegar (ACV) on healthy individuals by looking at body composition, blood glucose levels, and cholesterol. In recent years, the usage of Apple cider vinegar as a dietary supplement has skyrocketed; yet very little scientific evidence supports the safety and effectiveness of consuming Apple cider vinegar or Apple cider vinegar as a dietary supplement. Participants (N= 14, 12 females, 2 males, mean age = 22.5 years old, SD= 2.1) for this study were randomly assigned to two different groups: apple cider vinegar (liquid) (N=7) or apple cider vinegar (gummy supplement) (N=7). Both groups consumed 1000 mg of apple cider vinegar which was the equivalent of two ACV gummies daily or 1oz of liquid ACV daily. Both groups were instructed to take their supplement at the same time every day for 4 weeks. Pre- and post- study, the participant's weight, BMI, blood pressure, blood glucose, cholesterol levels, and body fat percentages via air-displacement plethysmography (Bod Pod) were measured. It was hypothesized that liquid ACV users would experience a more significant change in cholesterol and blood glucose levels than the ACV gummy users. Results showed no significant difference between cholesterol, blood glucose, BMI, or percent body fat between the two groups.

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Interaction of Stress and Environment on Learning

Alisha Lozenski

Institution: **Viterbo University**

Faculty Mentor: ***Charlie Lawrence***
Discipline: ***Neuroscience***
Co-author*:* ***Mira Kendall***

Presentation Type: ***Poster Presentation***

Abstract:

The environment has been shown to interact with stress, either exacerbating or ameliorating its effects. Environmental enrichment (EE) provides increased cognitive stimulation through sensory and novel objects, social interaction, exploration and physical exercise compared to standard environments. Animals reared in enriched environments exhibit increased levels of exploration in novel situations, enhanced learning and memory behaviors, and less depression-like symptoms. Thus, we hypothesize that environmental enrichment, in the presence of random chronic mild stressors would alleviate or prevent the negative impact of stress on behavior. Thirty-two Long-Evans derived rats were assigned to either a standard cage or EE cages and exposed to stressors such as reduced and wet bedding and 24-hour light cycles, each lasting a minimum of 1 week and all previously shown to demonstrate increased stress and anxiety levels. To evaluate its specific impact on hippocampal-dependent learning, we utilized a simple Y-maze task to determine recall ability and novel exploration behavior following a training phase. To examine the effects of enriched environments on depression, subjects underwent a forced swim task.

Determining the influence of phosphorylated Rap1b on Megakaryocyte regulation

Audrey Mattmiller

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Jaclyn Wisinski***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

Platelet counts are tightly regulated through production by megakaryocytes and clearance by hepatocytes. Thrombotic risk and poor cancer prognosis correlate with platelet counts on the high and low ends of the normal range, respectively. Therefore, understanding the factors that regulate megakaryocyte survival and function are important for human health. The small GTPase, Rap1b increases in abundance as megakaryocytes mature and mediates survival in other cell types by preventing apoptosis. We hypothesize that disruption of the Rap1b gene in the megakaryocytic leukemia cell line, DAMI, will limit cell survival by increasing susceptibility to apoptosis. We used CRISPR/Cas to specifically disrupt the Rap1b gene, resulting in no detectable Rap1b protein in DAMI cells. Compared to wild-type DAMI cells, Rap1b knockout cells had nearly a 50% reduction in survival as measured by metabolic activity using an MTT-assay. To assess apoptosis susceptibility, we monitored caspase activity using the Fluorochrome Inhibitor of Caspases (FLICA). These results suggest that Rap1b promotes megakaryocyte survival.

Assessing a Bone Marrow Derived Dendritic Cell Line's Ability to Process and Present an Antigen

Tristan Meighan

Institution: **Viterbo University**

Faculty Mentor: ***Chris Mayne***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

The immune system is the body's natural defense mechanism against a myriad of life-threatening viruses and bacteria. Two critical components of the immune system's ability to respond to pathogens are dendritic cells and T-cells, which allow the body to effectively deal with infections. While these two cell types are known to be major players in the immune response, the way these two cells interact is still not fully understood. The reason for this is that dendritic cells have many subtypes that only interact with certain pathogens and subsets of T-cells making attempts to study the mechanism of T-cell activation problematic. This necessitates the derivation of a dendritic cell line that can activate T-cell so that the mechanism can be investigated through future experiments. In this study, bone marrow cells from mice were cultured in the presence of GM-CSF increasing the pressure on the bone marrow cells to differentiate into the desired dendritic cells. This derived dendritic cell line was then cocultured with a T-cell line and its respective antigen to assess the ability of these dendritic cells to process and present an antigen. An ELISA was done to determine the level of T-cell activation by quantifying IL-2 secretion. The results indicated that the dendritic cells were able to activate T-cells when either the T-cell specific peptide sequence or the entire protein was added to the culture. This demonstrated that the dendritic cells could not only present the already processed antigen to the T-cells, but also process the protein down to the target antigen. By successfully deriving a dendritic cell line with the capacity to present antigen to T-cells an obstacle to studying this activation was resolved. Future exploration of this interaction could discern valuable information about how this pivotal part of the immune response functions.

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Life of a College-Aged CNA: The Impact of Death

Faith Meltz

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel Braley & Tyler Flockhart***
Discipline: ***Social Sciences***

Presentation Type: ***Poster Presentation***

Abstract:

Certified nursing assistants (CNAs) are a key component in health care today. They provide care behind the scenes that help patients in medical facilities to live their lives in healthy and safe environments. They provide care that helps patients recover fully or help them live their lives in the most comfortable way possible. Without CNAs, the healthcare field would be greatly devastated but how does this work affect CNAs? This study explored religious, spiritual, moral, and other beliefs, concepts, and practices in college-age certified nursing assistants (CNAs) working in nursing care facilities during the COVID-19 pandemic. Purposive sampling and the snowball technique were used to identify potential interview subjects who were current college students or recent college graduates employed as a CNA between March 20, 2020, and the present. Interview participants (n=22) were drawn from the South Atlantic, Southeast, and Midwest regions. Semi-structured interviews (60 – 90 minutes) focused on a wide variety of topics including their CNA experience, changes they experienced during COVID-19, challenges of CNA work, the impact of religion and spirituality in their work, the impact of death, their view on the afterlife, and the different types of support they received during this time. Interviews were transcribed, coded, and analyzed for themes. This poster focuses on the impact on college-aged CNAs of resident and patient deaths. Three main themes emerged in the analysis: emotional impact, cognitive impact, and the different means of coping they used to deal with death. Through these themes, it was discovered CNAs can be affected by a death they might see in many ways and have different means of how they cope with their experiences. Some of the participants were greatly affected by their experiences with death while at work, while others were not as affected. The means of coping with these difficult times also differ among the participants. Collectively, the findings from this study reveal CNAs are affected by the death of their patients or residents in a variety of ways and have different methods of coping.

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RESEARCH SYMPOSIUM

CNAs: Challenges and Support Through Frontline Pandemic Work

Jerica Mueller

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel Braley & Tyler Flockhart***
Discipline: ***Sociology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Certified Nursing Assistants, or CNAs, are a vital part of American healthcare, serving as the primary caregivers for patients in both hospitals and long-term care facilities. Through the course of their work, but especially through the unprecedented COVID-19 pandemic, CNAs have been burdened with emotional, social, and spiritual challenges that go far beyond their expected job description. In this study, college aged CNAs who worked through the pandemic were interviewed to determine the extent to which their work affects them emotionally, psychologically, and spiritually. Convenience sampling allowed for over twenty interviews from participants in the Midwest, Southeast, and South Atlantic regions of the United States. Participants engaged in 90-minute semi-structured qualitative interviews focused on their experiences and stories, both prior to and during the COVID-19 Pandemic. Questions focused on participant's role as a CNA, their major challenges in their work, their religions/worldviews, and the impacts the pandemic had on all areas of their job. Transcribed interviews were coded according to common themes regarding spirituality, coping with death, and CNA's general challenges. From these codes, findings emerged that demonstrated the ways in which CNA's challenges were amplified by the COVID-19 pandemic. Facility visitation rules, personal protective equipment, and changes in job duties were the prevailing stressors for CNAs during this time. Through these challenges, however, CNAs were able to identify how educators, facilities, and the public could better prepare and help them through their work. Overall, these interviews illuminated the mindsets and actions that led CNAs to be successful and persistent through the hardships associated with their work during the COVID-19 pandemic.

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The Impact of the COVID-19 Pandemic on Burnout in Filipino Nurses

Bailey Nuutinen

Institution: **Viterbo University**

Faculty Mentor: ***Janet Holter***
Discipline: ***Nursing***

Presentation Type: ***Poster Presentation***

Abstract:

Burnout has been a challenge that nurses have faced throughout history, but the rate of burnout has increased significantly since the COVID-19 pandemic began. Nurses across the world have worked the frontlines of the pandemic through some of the most difficult times healthcare has seen, but their work did not come without a cost. The purpose of this study was to evaluate the impact that the Covid-19 pandemic had on burnout in Filipino nurses. A qualitative study was conducted using surveys, observational data, and interviews with nurses who worked at Western Visayas Medical Center, a government-run hospital, in Iloilo, Philippines. The results showed several commonalities among the nurse's reports that were related to burnout. Some of these common factors included understaffing, lack of resources, high-stress environments, and feelings of isolation. Although these factors increase the prevalence of burnout in nurses, the nurses also reported an increased sense of pride in their work and overall persistence related to the pandemic.

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RESEARCH SYMPOSIUM

How Have CNA Worldviews Changed While Working During COVID-19?

Alexis (Lexi) Oestreich

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel-Braley & Tyler Flockhart***
Discipline: ***Sociology***

Presentation Type: ***Poster Presentation***

Abstract:

Certified Nursing Assistants (CNAs) are viewed as the backbone of all medical facilities. Without CNAs, patients in Assisted Living Centers and hospitals would not receive the care that is needed for them to make full recoveries or live the last of their days comfortably. It is obvious that patients benefit from CNAs, but how are CNAs affected by their work? In this study, the emotional, psychological, and spiritual well-being of college-aged CNAs are evaluated based on everyday work stresses, religious views, exposure to death, and the impact of COVID-19. The researchers interviewed college-aged CNAs from the Midwest, Southeast, and South Atlantic about how COVID-19 affected their work as well as their religious, spiritual, and moral beliefs. This study specifically focused on how their emotional and spiritual well-being have changed while working as CNAs during the time of a global pandemic. The participants, who were recruited through convenience sampling, answered questions related to topics such as work stress, religion/spirituality, views on the afterlife, and the effects of COVID-19 in 90-minute semi-structured interviews. After being transcribed, interview responses were coded for major themes regarding spirituality, morality, perspectives on death and the afterlife, and general worldviews before and during COVID-19. The findings demonstrated both changes and sameness in the emotional and spiritual well-being as well as moral views of college-aged CNAs. For those whose views had changed, patient suffering, patient death, and COVID-19 stress had major influences. It was also found that many CNAs did not change their views for these same reasons, in fact, many CNAs strengthened their religious and moral views as a result of their work. Collectively, the findings from this study exhibit the substantial impact that COVID-19, as well as daily work stress, has had on CNAs.

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RESEARCH SYMPOSIUM

The Effect of Atrazine Exposure on Mice Gestation Period

Alexis Pogatchnik

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Debra Martin***
Discipline: ***Biology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Atrazine has become one of the most prominently used herbicides in the United States. Atrazine has been found in sources of drinking water leaving organisms susceptible to its adverse effects. Many studies have been completed utilizing Xenopus laevis species that characterize atrazine as an endocrine disruptor. Due to this endocrine activity, atrazine upregulates the enzyme aromatase causing an increase in androgen to estrogen conversion. Overregulation of the enzyme disrupts normal reproductive functions impacting gestational periods. This preliminary study aims to determine if exposure to 0ppb, 3ppb, 30ppb, and 300ppb of atrazine has an effect on the gestational period in mice. Length of mice gestation period, pup weight, and litter size were measured and no statistical difference was found due to low numbers.

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RESEARCH SYMPOSIUM

Pretest-Posttest Measures for Dialectical Behavioral Therapy Within a Clinical Setting

Olivia Rawlyk

Institution: **Luther College**

Faculty Mentor: ***Dr. Joseph Breitenstein***
Discipline: ***Psychology***

Presentation Type: ***Poster Presentation***

Abstract:

Borderline personality disorder (BPD) is characterized by patterns of instability relating to interpersonal relationships, self-image, mood, and impulsive behaviors, and often presents this symptomatology in a variety of contexts. (American Psychiatric Association [APA], 2022). BPD occurs in 2.7% of the general population and commonly presents alongside comorbid disorders (APA, 2022). This disorder can be treated by Dialectical Behavioral Therapy (DBT), which is an evidence based treatment that primarily targets BPD symptoms and was created by Dr. Marsha Linehan (Linehan, 1993, as cited in Van Dijk, 2012). DBT focuses on specific life skills and behavior modification through the use of teaching modules and a combination of modes of therapy. This research explores the limitations that the nature of BPD can have on the effectiveness of DBT treatment. Data were collected from clinical records of clients involved in DBT treatment at Plum Behavioral Health Services regarding attendance and compliance to the DBT treatment model. Limitations were identified and compiled regarding client success and data collection. Pretest and posttest measures were suggested as a means to collect qualitative and quantitative data within a clinical setting.

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RESEARCH SYMPOSIUM

In Silico Analysis of the Binding Specificity of AcrB in E. coli

Trevor Rowray

Institution: **Viterbo University / University of Michigan**

Faculty Mentor: ***Dr. Charles Brooks III***
Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Abstract:

Antibiotic resistance in bacteria is a growing health concern due to continuously evolving mechanisms of resistance including efflux pumps. AcrB is the substrate recognizing subunit of one such protein in E. coli. This study aims to characterize the binding of AcrB to a variety inhibitors and antibiotics to develop a model that can be applied to other small compounds that may act as inhibitors. Docking simulations were performed to analyze the binding of known inhibitors and other substrates of AcrB. FACTS implicit solvation was used to estimate the absolute binding affinity for each ligand. Each inhibitor had a lower relative binding affinity than the tested antibiotics. A larger sample size is needed to analyze the statistical significance of these results, but this approach may have the ability to computationally differentiate between likely inhibitors and non-inhibitors of AcrB in preparation for experimental validation.

Self-as-Doer Identity and COVID-19 Behaviors: The Mediating Role of Beliefs in Control Methods

Kaitlyn Rusch, Cooper Scheldroup, Kotoko Yui (group poster)

Institution: **Winona State University**

Faculty Mentor: ***Amanda Brouwer***
Discipline: ***Psychology***

Presentation Type: ***Poster Presentation***

Abstract:

Young adults have some of the highest rates of transmission and lowest immunization rates. As such, there is a need to better understand factors promoting adherence to COVID-19 preventative behaviors among young adults. Researchers have demonstrated that strong beliefs in disease control methods, (e.g., mask wearing, hand washing, social distancing) and identity-related factors predict increased engagement in COVID-19 preventative behaviors. The self-as-doer identity, a motivational identity which explains how identification as the doer of a behavior motivates one to participate in the behaviors associated with that identity, predicts healthy behaviors and some COVID-19 preventative behaviors. Less is known, however, how the self-as-doer affects COVID-19 behaviors. It may be that stronger doer identities are associated with stronger beliefs in their control methods, which might then be associated with more engagement in COVID-19 preventative behaviors, but this has yet to be explored. Therefore, we explored the mediational effect of beliefs in control methods in the relationship between self-as-doer identity and engagement in COVID-19 preventative behaviors.

Participants (N=167; Mage=19.88, SD = 1.839) answered questions about beliefs in control methods, self-as-doer identity, and COVID-19 mitigation behaviors. A mediation analysis was conducted to assess whether the relationship between self-as-doer identity and COVID-19 preventative behaviors could be explained by beliefs in control methods.

There was a significant effect of self-as-doer identity on COVID-19 preventative behaviors through beliefs in control methods, b = 1.52, 95% BcaCI [.57, 2.58]. Higher levels of doer identity were associated with higher levels of beliefs in control methods, which was then associated with greater engagement in COVID-19 behaviors. It could be that adopting an identity as a mask wearer, for example, might help promote the belief in control behaviors, like mask wearing because one is able to identify with that behavior. Identity then may motivate further engagement and trust in such a behavior, especially for young adults.

Oncolytic Reovirus Inhibits Breast Cancer Aggressiveness

Kaitlin Schiferl

Institution: **Viterbo Unitersity**

Faculty Mentor: ***Luke Bussiere***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

Breast cancer has a 99% 5-year survival rate when diagnosed early, but in patients with tumors that have progressed and spread throughout the body, the 5-year survival rate drops to around 30%. This is due to decreased therapies for systemic tumors and highlights the need for therapies that inhibit cancer spread. Within cancerous tumors hypoxic regions, areas lacking oxygen, result in the accumulation of HIF-1a that has been shown to induce blood vessel formation to the tumor called angiogenesis. HIF-1a induces pro-angiogenic factors, like vascular endothelial growth factor (VEGF) and angiopoietin 2 (Ang-2), that promote new vasculature between the tumors and previously established blood vessels, making the perfect highway for cancer spread. Subsequently, research has shown that increased HIF-1a accumulation in tumors results in poorer prognosis for cancer patients. Interestingly, mammalian orthoreovirus (MRV), an oncolytic virus that is currently being investigated in clinical trials as a therapy for breast cancer patients, has been shown to inhibit HIF-1a accumulation in several cancer types. Using immunofluorescence assay we were able to observe and quantify a statistically significant decrease in HIF-1a accumulation in AU565 breast cancer cells. This work suggests that MRV also inhibits HIF-1a in clinically relevant breast cancer cells and suggests that MRV may also decrease angiogenesis and cancer spread. Ongoing and future work will investigate if MRV can also inhibit the transcription of pro-angiogenic factors VEGF and Ang-2. The results generated from this research will contribute to insight needed for MRV approval as an oncolytic virus therapy. Additionally, this work suggests that apart from killing tumors, MRV may also inhibit cancer spread and should be investigated in patients with high levels of HIF-1a expression.

Feasibility of Growing Green for the Viterbo Cafeteria

Samantha Schnick

Institution: **Viterbo University**

Faculty Mentor: ***Tiffany Lein***
Discipline: ***Nutrition***
Co-author: **Sharice Elbert**

Presentation Type: ***Poster Presentation***

Abstract:

This research project focused on the feasibility of nutrition students growing fresh lettuce varieties from the hydroponics vertical growing system that we have in our nutrition department and selling the product to the Viterbo cafeteria. Currently students get to experience growing and harvesting a variety of produce in class as curriculum, but then begin to question what will be done with it. By collaborating with our mentor and the foodservice director at Viterbo, a new idea of what to do with the produce arose. For this project we completed one growing rotation of fresh herbs and lettuces through the hydroponics system. To compare the two options we priced out the cost of supplies needed to grow herbs in the hydroponics system, such as rockwool, which is the growing medium used, as well as seeds and growing nutrients. There was a cost analysis and comparison completed to determine the cost of fresh produce per ounce being purchased from a vendor of choice by the cafeteria versus the cost of growing from the hydroponics system. From our results, it was determined that the harvest yielded from one hydroponics growing system does not provide a significant profit or amount of produce to sustain a partnership with the Viterbo Cafeteria. In the future, we plan to use the hydroponics system to grow fresh produce for our nutrition courses to utilize during food labs.

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RESEARCH SYMPOSIUM

Assessing the Efficacy of zoledronic acid in a model of Cardiomyopathy

Aynur Shirmamedova

Institution: **Waldorf University**

Faculty Mentor: ***Dr. Gary Coombs***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

Emery Dreifuss Muscular Dystrophy (EDMD) is a rare muscle disorder that caused by mutations in the LMNA gene. Symptoms include weakness and atrophy of voluntary muscles of the arms, legs, face, neck, and spine, and impaired cardiac muscle function. When expressed in skeletal muscles, mutant lamin proteins negatively impact quality of life. When expressed in the heart, they can cause dilated cardiomyopathy leading to shortened life span. In this research, I am expressing mutant lamins in adult drosophila heart using the d.hand driver strain and following survival to identify a concentration of Zoledronic Acid (ZA) that will exert a positive impact on survival. In an initial experiment, I treated d.hand x R564P drosophila with 500 ZA, which negatively impacted life span of model flies compared to vehicle treated and control flies. This suggests that 500 ZA causes some toxicity. Currently, I am working with lower doses of ZA to find a concentration that will ameliorate the cardiac defect(s) in EDMD model flies.

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UNDERGRADUATE
RESEARCH SYMPOSIUM

Impact of Italian immigration on Argentinian culture

Kiki Skemp

Institution: **Viterbo University**

Faculty Mentor: ***Jesus Jambrina***
Discipline: ***Spanish***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

Between 1857 and 1940 there was a large influx of Italian immigrants in Argentina. In fact, the influx was so great that almost half of the post-colonial immigration to Argentina came from Italy and more than half of the Argentine population can attest to some degree of Italian ancestry. Obviously, this greatly impacted Argentine culture. Proof of this can be found to this day in all aspects, such as language and cuisine. However, we must begin by analyzing the historical context of the time and what pushed so many Italians to undertake that journey.
The Italian diaspora occurred mainly because of the economic opportunity that Argentina offered. Apart from the lack of employment and in Italy, there were several more specific reasons. One of them was, for example, the cholera epidemic that took place in the 1880s.
During this study I will expose the various aspects in which Italian culture, language and cuisine have influenced the Argentina we know today. Many words derive from Italian ones, particularly those of the southern Italian dialects. Some examples are "birra" and "parlar", both words that originated in Italy. When it comes to language, Italy has also impacted the phonetics of Argentine Spanish. As for food, thanks to the diaspora, the Argentine diet is very close to the Mediterranean.

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RESEARCH SYMPOSIUM

Investigation of Cancer Biomarkers Using SERS

Bianca Spoerl & Anna Berthiaume

Institution: **University of Wisconsin - Eau Claire**

Faculty Mentor: ***Dr. Sanchita Hati & Dr. Laurel Mc Ellistrem***
Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Abstract:

Surface Enhanced Raman spectroscopy (SERS) can be used to detect changes in the composition of human saliva that may indicate the presence of cancer biomarkers. Cancer is a prevalent disease that affects many people. By using SERS with human saliva, a painless and possibly more effective way to detect cancer can be created. Like blood, saliva can show changes in proteins and concentrations of certain molecules that occur due to cancer. The method that our group will focus on is SERS which is an extremely sensitive spectrophotometric method. This is necessary when using saliva samples as many analytes are in very low concentrations. Our group is still in the preliminary stages of using the Raman spectrophotometer and optimizing SERS conditions. Moving forward, our group hopes to successfully run treated saliva samples on the Raman.

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RESEARCH SYMPOSIUM

Influence of Black Light on Nocturnal Insects of Different Ecosystems

Amanda Tranberg

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Ted Wilson***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Abstract:

Blacklight trapping has been used by entomologists to study nocturnal insect diversity. The blacklight traps allow entomologists to view and collect which nocturnal insect species are more abundant in different areas. The UV light in the traps attracts nocturnal insects because of its shorter wavelengths that are invisible to the human eye. The purpose of this study is to determine if a change in wavelength, comparing a UV light's wavelength to a wavelength like a streetlamp will attract different nocturnal insects. By comparing the difference in wavelengths, it can also measure the diversity of the insects because some nocturnal insects will be attracted to one wavelength over the other. With this information, nocturnal insect diversity can be measured by location with comparing countryside versus cities.

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RESEARCH SYMPOSIUM

PREDICTION OF THE SPREAD OF WHITE-NOSE SYNDROME IN BATS ACROSS THE UNITED STATES

Elizabeth Trnka

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Benjamin Pauli***
Discipline: ***Biology***

Presentation Type: ***Oral presentation (10-12 min presentation, 3-5 min Q&A).***

Abstract:

White-nose syndrome (WNS) is an emergent disease that is caused by the fungus Pseudogymnoascus destructans. This fungus appears on the wings, muzzles, and ears of bats and disrupts bats during their hibernation period which can lead to mortality. Since its first documentation in 2006, WNS has spread throughout the United States and Canada and resulted in the deaths of millions of bats. Identifying which regions are most susceptible to future WNS infections will allow for precautionary measures to be taken to manage WNS more effectively. To generate a predictive map of high-risk areas of future infection, US counties with confirmed WNS cases were used as known WNS occurrence points to create a model that compared environmental factors between these points and random locations in the US. Environmental factors tested were specific humidity, precipitation, downwelling solar radiation, minimum and maximum air temperatures, vapor pressure deficit, and wind speed near the surface. The created model was able to predict WNS occurrence locations with satisfactory accuracy based solely upon the factors used. It was found that WNS is more likely to occur in areas of high solar radiation, increased vapor pressure deficit, and increased temperatures. The presence of WNS is predicted to become more prevalent throughout the Southeast, Mid-West, Rocky Mountains, and Pacific West regions of the United States though the extent to which the regions are impacted is dependent upon the severity of future climate change.

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RESEARCH SYMPOSIUM

Mississippi River Disposition Study: Engaging the Public

Amber Wiedenhoeft

Institution: **Macalester College**

Faculty Mentor: ***Roopali Phadke***
Discipline: ***Environmental Studies***
Co-author: ***Romeo Gomes***

Presentation Type: ***Poster Presentation***

Abstract:

We are investigating the U.S. Army Corps of Engineers (Corps) Mississippi Disposition Study process and findings. The Corps is conducting a study of the Upper St. Anthony Falls Lock and Dam, the Lower St. Anthony Falls Lock and Dam, and Lock and Dam No.1 on the Upper Mississippi River. Their study will determine the next steps for the lock and dam structures on the river. The options the Corps is considering for Lowers St. Anthony Falls Lock and Dam, and Lock and Dam No.1 are selling to another entity, maintaining the structures as they are, and removing them completely. The public plays an important role in these decisions. We have sought to engage the public in a variety of ways including through walking, biking, kayaking and boat tours of the river to gauge their thoughts on the Army Corps process and what they wish for the future of the river. Our research is ongoing as we attempt to reach and involve a larger and more diverse sector of the public than the Army Corps was able to reach.