

2024 Research Forum Project Abstracts

Student Authors: Isaiah Blain, Madison Dietz, Abigail Grieser, Miriam Landon, and Anna Newton

Faculty Author: Erin Bales

Program: OT Graduate Program

Title: Diagnosis and Treatment of ASD in Rural Healthcare Systems: A Scoping Review

Children who reside in rural areas often have limited access to healthcare, leading to health disparities. Those families that have children with autism spectrum disorder (ASD) are even further impacted in rural areas, often delaying timely diagnoses and treatment. **Objective:** To evaluate the availability of ASD timely evaluations and treatment outcomes in rural areas for children ages three to eighteen. **Data Sources:** Peer-reviewed literature published in the last 15 years from the American Journal of Occupational Therapy, Journal of Occupational Therapy, PubMed, and Academic Search Complete were used for this scoping review. Twenty-one articles were selected. **Study Selection and Data Collection:** The researchers followed PRISMA guidelines to complete this scoping review, selecting studies that reported on diagnosis and/or treatment for ASD, or the lack thereof, in rural vs. urban areas. Twenty-seven studies met the selection criteria and were retrieved for full review. Twenty-two were included in this scoping review. **Findings:** Research indicates a significant need to explore barriers to rural medical care, particularly given the increasing demand for ASD diagnostic and intervention services for rural clients. **Conclusions and Relevance:** The findings of this scoping review indicate more high-quality (level I and II) research is needed to meet the increasing need for ASD diagnosis and occupational therapy intervention for children in rural areas. **What This Article Adds:** This scoping review emphasizes a lack of ASD timely diagnosis and intervention in rural settings. Occupational therapists can raise awareness and advocate for service provision for children with autism in rural areas.

Student Authors: Tyler Cook, Deepti Dulal, Taylor Lang, Samantha Skujins, and Austin Young

Faculty Author: Erin Bales

Program: OT Graduate Program

Title: Utilization of Telehealth to Access Occupational Therapy Services in Rural Areas: A Scoping Review

The purpose is to review how telehealth allows for better healthcare access to rural communities and examine the benefits of telehealth on individuals needing occupational therapy services. To examine and describe the current evidence about occupational therapy and telehealth services to allow healthcare to be expanded to the rural population. Forty peer reviewed literature published in health care sources between 2007-2023, found in Academic Search Premier, PubMed, MEDLINE, AOTA, Google Scholar. **Study Selection and Data Collection:** Studies that described or examined telehealth services with clients of all ages, conditions, or occupational issues using were included. Studies were excluded if they did not have a telehealth or rural focus, if they were not a peer reviewed article, or if they were published before 2007. The PRISMA guidelines were used to structure the scoping review. **Findings:** The findings indicate that telehealth is not easily accessible in remote areas, compared to urbanized areas. However, in the areas in which telehealth is accessible, evidence has shown that telehealth services are manageable and successful. Overall, telehealth is a tool that can make healthcare services more accessible, while still providing the same level of care. Many rural residents must travel far distances to acquire healthcare services because there are no immediate service available to them. The option of a virtual appointment could help those far distances get the proper treatment they need

without the need for travel. Poor internet quality and inexperienced technology users are also barriers to receive telehealth services.

Student Author: Delaney Weisend

Faculty Author: Chad McKay

Program: Agriculture

Title: Agricultural Major Concentrations and Leadership Style Relationships

This study surveyed agricultural students at Wilmington College to determine their major concentration, age range, sex, and leadership style. These data were analyzed and compiled to determine relationships between major concentration and leadership style, age range and leadership style, and sex and leadership style. Relationships were discovered. These results can be used to place students in various yet specific career and leadership positions that would best suit their own leadership styles.

Student Author: Izaia Billingsley

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: Amplifying Voices: Inclusive Media in a Diverse Society

Over the past few years, we have seen a surge in conversation and social commentary about representation in media. From television and movies to music and literature, stories have always reflected the diversity of human experience. Every individual on earth possesses a unique identity that is shaped by intersecting factors like race, gender, sexual orientation, nationality, and mental health. This research project, focusing specifically on television, aims to examine the accuracy and authenticity with which modern media portrays these complex human identities.

Student Author: Hannah Gaines

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: Creating a Positive Public Perception of Zoos Through Social Media

In today's digital age, social media has become a useful tool for communication. However, it has also become a platform for critique and judgment, particularly evident in the realm of zoos where negative narratives surrounding animal captivity occur. I examine the behind the scenes of zoos, their conservation efforts, animal welfare practices, and educational resources. My research provides insight on the usefulness of social media as a transformative tool for AZA-accredited zoos to reshape public perception and foster a positive understanding of their mission.

Student Author: Simon Heys

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: How TikTok Revolutionized Sport Media I examine how the rise of sport media on TikTok is leading to the decline of traditional outlets such as Sports Center on ESPN. By looking at the reach of content on TikTok through data research and analytics, I reveal evidence that TikTok is reshaping the way audiences engage with sport media. My research illustrates how important it is for sports organizations and media

corporations to embrace social media platforms, and how valuable social media managers are in this field.

Student Author: Ella Jones

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: Beyond the Clicks: The Unscripted Costs of Family Vlogging

Family vlogging - the subgenre of social media content that has grown exponentially within the last decade is affecting all involved in many ways. This topic is harmful to viewers, to the children participating, and family relationships. This paper aims to effectively communicate the results of the overarching research question "How does the social media content genre family vlogging affect its viewers, the children participating, and the family dynamics of viewers and creators?" The findings concluded that there are declines in family relationships and the mental health of viewers and content creators. My research also highlights privacy and financial concerns for children participating, lack of regulations from social media platforms, and tainted expectations of family relationships. As wholesome and lighthearted as these types of content may seem, this genre is detrimental to the social, emotional, physical, and financial well-being of all involved.

Student Author: Emily Kestermann

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: Equine Perceptions: Horse Welfare on Social Media

Social media has been growing exponentially in the past ten years. The equine industry has begun to switch from traditional marketing to utilizing social media. Both individuals and businesses use these platforms to share equine related content that is viewed by a large audience. Equine media has been able to inform and educate people on various topics in the industry including welfare. Equestrian influencers on social platforms show human-horse relationships and find common understandings with their audience. These accounts, along with organizations and veterinarians are seen as trustworthy and experts in the field. This allows for people to create conversations around a topic and discuss different practices and approaches that affect the industry. In this way, equine welfare has been able to improve. Viewers are able to see the life of a horse and the lifestyle of equestrians through social media. Through this, the audience may be able to see how the horse is taken care of and the environment they are living in. This can bring about questions, shared understandings, and concerns. The aspects of the industry that people find in common can create a call for change and reevaluate products and practices. There is a push for education across the equine industry as well as access to resources and information.

Student Author: McKayla Sites

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: Decoding the Algorithm for Consistent Growth on Instagram and Tik Tok through the Lens of a Small Business

Across the different social media platforms, algorithms decide which content to prioritize and make visible to each unique user. As a small business owner, it is important for me to know when to post and what content will give me the most engagement to grow my business. Across many studies, the data

produces inconsistent results, making it difficult to develop strategies around my posting activity on Instagram and Tik Tok. There are some similarities in times to post, but this has not gained much traction amongst the social media community. Using this information, I combined my creative strengths to develop a structured approach to growing my business on these platforms. Throughout my research, I have identified several trends. Currently, the best times to post are between 8am and 11am, as well as 5pm and 10pm. I have learned the social media companies are constantly making changes to how the algorithms prioritize content. I have been able to use this research to gain more views and followers. As I continue to apply this knowledge and refine my posting strategies, sales will increase as well.

Student Author: Jacob Stewart

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: The Benefits of Virtual Reality Through Exposure Therapy

The application of Virtual Reality in day-to-day life is an interesting topic. This is largely in part due to many concerns and controversies in mainstream media. People claim that Virtual Reality can jeopardize social life and leave users disconnected from the physical world. This research shows the positive application of the technology by demonstrating how it applies to the concept of Virtual Reality Exposure Therapy. I will explore the psychotherapeutic accessibility that Virtual Reality enables and how it ties into Virtual Reality Exposure Therapy, as well as concepts that would apply to a Virtual Reality landscape setting. The demonstration will be to create an interactive installation with the sole purpose of desensitizing users to the uncomfortable and fearful experience that it presents to the individual. During the demonstration, the user's heart rate will be monitored at key moments to determine if the experience is working as intended to show a broad idea of fear response and desensitization to said fear responses. The tests are currently ongoing and will require tests with multiple individuals. However, based on the research gathered, a concrete thesis regarding the positive application of Virtual Reality can still be hypothesized.

Student Author: Autumn Simpson

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: The Impact of Pornography Consumption on Gender Violence

The evolution of modern technology has made content such as pornography accessible to virtually anyone with an internet connection. Those with internet access can currently obtain explicit content at a younger age than ever before. Pornography consumption can be extremely harmful to viewers, and it may impact social, romantic, and intimate aspects of their relationships with others. However, the misogynistic narrative painted in many pornographic videos has created an attitude in society that perpetuates real-life violence against women. The consistent violence, objectification, and dehumanization towards women depicted in pornography has altered viewers' perception of women and what is considered acceptable interaction with them.

Student Author: Symone Daniels

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: Social Media & Global Peacebuilding

My research examines social media and global peacebuilding. I examine how the medium conveys many opinions and how global populations use these digital platforms. I breakdown how we perceive information on social media, noting that cultural and historical contexts establish the lens through which users experience the medium. The literature on this topic broadly revealed themes related to the rapid advancement of the technology, the social and political advantages, or disadvantages of its use, and how misinformation and disinformation can be quickly disseminated. The historical evolution of social media is explored, from the personal to institutional level, and through political, social, and cultural examples. Specific cases of social media use in Egypt and Japan are also provided to demonstrate different types of content use. I conclude that social media content can be used for good or bad, and is a neutral platform that can be harnessed for peacebuilding.

Student Author: Matthew Dugue

Faculty Author: Jeff Hazelden

Program: Art/Communication Arts/Theatre/Music

Title: The Christian Church: Needing a Social Media Revival

The Christian Church attendance is dropping, and dropping fast. One major hindrance for attendance would be the fact that the people in the church are not getting their needs met, particularly young adults. This can hold a significant weight in the church when attendance declines, because they have what most adults lack: influence. The youth bring our greatest resource. The influence that they bring to the church stems typically from social media. Their social media accounts can produce great opportunities for the church and increase attendance like wildfire, due to the amount of people they can share posts with in just the snap of a finger. Social media has been looked at as a negative thing to be a part of (which it can be), but the stronger argument would be the positive effects of what it can do for the Christian church- and how social media managers can use the tool of social media to help revive them.

Student Authors: GL320-M2 Wilmington Global Signature: Middle East and CA337 Advanced Photography Classes

Faculty Authors: Jeff Hazelden and Marlaina Leppert-Wahl

Program: Art/Communication Arts/Theatre/Music

Title: A Call for Peace - The Witness SP24

The Israel-Hamas War, which began in October 2023, has unfolded into a horrific humanitarian crisis characterized by unspeakable brutality, displacement, deprivation, and over 30,000 civilian deaths. Under faculty direction, students in the CA337 Advanced Photography and GL320 Wilmington Global Signature: Middle East courses critically examined the ongoing violence and desperate need for a lasting peace in the region. Together we created a special edition of The Witness, Wilmington College's student-led newspaper, reflecting our concerns and developing understanding of the conflict and plight of the victims. Through the research, writing, and photographs of creative collage work of Wilmington College students, the publication examines events surrounding the war and invites readers to see the humanity in all those suffering in this conflict. The work is intended to advance Wilmington College's goal of Global Awareness and connects inextricably to the institution's core values of Peace and Social Justice and Respect for All Persons.

Student Author: Nina Lombardo

Program: Biology/Chemistry/Math/Physics

Title: Cell-Free Polyphosphate Synthesis using Vtc4 Kinase

Inorganic polyphosphate (polyP) is a negatively charged polymer composed of many repeating units of orthophosphate linked by high-energy phospho-anhydride bonds. These are biopolymers found in all living things including bacteria, fungi, plants, animals, and humans that serve a wide range of functions. Research of polyP has become a topic of great interest as many potential applications are possible including uses in tissue engineering, dental care, wound healing, artificial blood vessels to bone and cartilage regeneration/repair materials. In our research, the goal was to optimize synthesis of polyP in vitro through a cell-free method using vacuolar transporter chaperone 4 (Vtc4) polyphosphate kinase, found in budding yeast, *Saccharomyces cerevisiae*. Here, we analyzed and compared two divalent cations, Mn^{2+} and Mg^{2+} , and their effect on Vtc4 and polyP synthesis through a time-course study. We found the Mn reaction resulted in immediate and higher production of polyP at the earlier timepoints but then decreased over time whereas the Mg^{2+} reaction resulted in higher yield of polyP overall but requires a longer incubation time. The results from this study will provide a useful base for future research in optimizing cell-free polyP synthesis.

Student Author: Olivia Fuhrman

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: Application of RSM and ANN for the optimization of bioactive compounds from *Brassica var. acephala* L. and their biological activities

The quest to develop new novel natural health products (NHPs) led to the ultrasonication-assisted optimization of Kale (*Brassica oleracea var. acephala*) by response surface methodology (RSM) and artificial neural network (ANN) in a second-order polynomial and 3n full factorial interconnected neural design model. The processing parameters were sonication time (10 - 30 min), sonication temperature (20 – 60°C) and solvent concentration (40 - 80%). The predictability of the RSM model was compared with a machine learning algorithm (ANN). An orthogonal time-of-flight GCMS and LCMS equipped with electron impact (EI) and chemical ionization (CI) having a resolution above 7000 FWHM were employed to profile the chemical compounds. FTIR was employed for functional group determination while phytochemical screening, antidiabetic assays and molecular networking were carried out and compared with conventional methods. The optimized values have a sonication time of 10 min, temperature of 20°C and a solvent concentration of 40% which yielded a total phenol content (TPC) of 128.91 mg GAE/mL, 78.91% DPPH inhibition, and 91.93% ABTS inhibition. The results also revealed TPC and TSC values of 133.02 mg GAE/mL and 0.21 mg OAE/g when compared with the conventional extraction methods (113.94 mg GAE/mL and 0.18 mg OAE/g) with more bioactive constituents and medicinal properties. Interestingly, the ethanol concentration was 40% as against 70% of conventional extraction methods. Among the two models, ANN have a higher prediction ability compared with RSM. Therefore, the higher coefficient of determinant (R^2) of the ANN model makes it a better predictive model compared to RSM model.

Student Author: Alexandria Yaekle

Faculty Author: Oladapo F. Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: Bioactivity-guided characterization of phytochemicals from *Spinacia oleracea* L. using a chemometrics approach

High consumption of spinach has been reported to be correlated with a decrease in metabolic and cardiovascular disorders due to the bioactive compounds such as polyphenols found in high quantities. For industrial application, there is a need for sustainable methods of extraction that increases the extraction of bioactive compounds. Hence, the need for ultrasonic-assisted extraction. The experimental design was carried out using central composite design (CCD) of response surface methodology (RSM) and confirmed with the predictability models of Decision Tree (DT) and Support Vector Machine (SVM). Variables were sonication time (10 - 30 mins), temperature (20 – 60oC), and solvent concentration (40 - 80%). An HP 6890 GC-LC/MSD system was used to characterize the chemical compounds while FTIR was used for various functional groups. Furthermore, medicinal activities were established using α -amylase, glucosidase, and molecular docking assays. Moreover, these bioactive components were categorized using principal component (PCA) and hierarchical component (HCA) analyses. It was found that the solvent concentration had the maximum effect on the antioxidant properties. The optimum conditions for maximum antioxidant activities were a sonication time of 10 min, temperature of 20oC, and solvent concentration of 70.17% due to the nature of their bioactive compounds. This resulted in a total phenol content of 346.58 mg GAE/mL, 70.80% DPPH inhibition, and 67.59% ABTS inhibition. Furthermore, optimized extracts had a higher saponin content (0.24 mg OAE/g DW) when compared with conventional methods (0.18 mg OAE/g DW). Moreover, optimized extracts had more bioactive compounds and higher medicinal activities than conventional extraction methods.

Student Author: Milain Burns

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: A Multiplex Approach for the Characterization of *Brassica oleracea* var. *capitata* Using GCMS, LCMS, FTIR, RSM, ANN, and PLS-DA Regression Analyses

Brassica oleracea var. *capitata* contains high medicinal properties due to the presence of saponins and polyphenols. Different extraction methods have been previously used, however, due to low extraction yield and high energy cost, there is a need to utilize modern sustainable methods. RSM with central composite design model was used to optimize cabbage extracts. The predictability of the RSM was compared with data-driven neural network (ANN) and partial least square – regression (PLS-DA) models. Phytochemical screening and antioxidant analyses such as total phenol content (TPC), total saponin content (TSC), ABTS, and DPPH were carried out in the optimized extracts and conventional extraction methods. An HP 6890 GC-LC/MSD system was used to characterize the chemical compounds while FTIR was used for various functional groups. Furthermore, antidiabetic activities were established using α -amylase, glucosidase, and molecular docking assays. The optimized values had sonication time of 10 min, temperature of 60°C and ethanol concentration of 68.32% while values of 200.18 mg GAE/mL, 80.16% and 91.83% were obtained for TSC, DPPH and ABTS, respectively. The PLS regression had a high coefficient of determinant (R^2) of 0.993. From the PLS-R, it was observed that the solvent concentration was significant for high medicinal values of the cabbage extract. The optimized extracts had 469.58 mg GAE/g DW compared with 352.74 mg GAE/g DW of TPC and a similar value for TSC (0.43 mg OAE/g DW). Moreover, optimized extracts were found to contain more bioactive compounds. Therefore, the modeling techniques were adequate for the prediction of the experimental process.

Student Author: Jaylah Captain

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: Chemical profiling of *Brassica oleracea* var. *italica* using GC- and LC-QTOF-MS/MS, molecular networking, chemometrics, decision tree (DT), and response surface methodology (RSM).

Broccoli (*Brassica oleracea* var. *italica*) is a medicinal plant with therapeutic potentials in preventing degenerative diseases. However, due to many extraction and maceration methods, there are limitations in the extraction of its phytochemicals. Moreover, there is the need to evaluate its medicinal activities. Hence, the need for green ultrasonication-assisted extraction. The extraction process was further optimized using response surface methodology (RSM) and a data-driven model (decision tree). The optimized extract was analyzed for its antioxidant activities. A hybrid GC/LC quadrupole time-of-flight mass spectrometer equipped with electrospray ionization (EI) source was employed for chemical profiling of the optimized and conventional extracts. FTIR was used for functional group determination while antidiabetic, anti-inflammatory, and anticancer analyses were performed using α -amylase, glucosidase, and in-silico assays. These results were further evaluated using principal component (PCA) and hierarchical cluster (HCA) analyses. The optimized values had a sonication time of 10 min, temperature of 20°C and solvent concentration of 40% with TPC of 225.07 mg GAE/mL, 78.37% DPPH and 91.99% ABTS inhibitions. The optimized extracts had a higher polyphenol (375.85 mg GAE/mL DW) than conventional method (316.73 mg GAE/mL DW) with a lower saponin content (0.18 mg OAE/g DW). However, the conventional method utilizes 70% ethanol concentration with lower medicinal activities and phytochemical constituents when compared with our optimized extracts. The result also revealed high coefficient of determinant (R^2) which are 0.992 and 0.954, respectively for both RSM and DT. Therefore, RSM and DT modeling techniques accurately predicted the antioxidant and medicinal properties of the broccoli extracts.

Student Author: Alexandria Partin

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: Metabolomic and chemometric studies on *Brassica oleracea* Var. *botrytis* using RSM and PLS-DA optimization methodologies and their biological activities

Total phenol content (TPC) was estimated using the Folin-Ciocalteu method. An acidic stock solution with a concentrate of 2,940 was used to product the calibration curve. The solution was then diluted with 80% methanol buffer with a 5-minute incubation period where 80 microliter of 7.5% Na_2CO_3 was added. TSC was used to determine the vanillin-sulphuric acid content and to measure the absorbance of the standards and the extracts. Using 1,1-diphenyl-2-picryl hydrazyl (DPPH), an RSA of the extracts was tested. The stock solution was prepared by dissolving 24 milliliters of DPPH in 100 milliliters of methanol. Methanol was used to filter the DPPH solution produced. An Absorbance is run with the DPPH produced and the following formula is used to determine the antioxidant of the standard. % of antioxidant activity= $[(A_c - A_s) / A_c] \times 100$ Where A_c -control reaction absorbance; A_s -testing spectrum absorbance. With adjustments, ABTS was conducted using Potassium persulfate solution, an ABTS solution and stock solutions. A spectrophotometer was used to determine the absorbance of the solutions for 7 minutes at 734 nm.

Student Author: Hannah Gaines

Faculty Author: Amanda Rollins

Program: Biology/Chemistry/Math/Physics

Title: Recovery Times of Caribbean Hermit Crabs (*Coenobita clypeatus*) Exposed To A Perceived Predatory Scenario

Hermit crabs withdraw into their shells as a fear response when exposed to a perceived predator scenario. This fear response can be conditioned with repeated exposure to a benign stimulus. However, it is unknown whether hermit crabs will continue to be deconditioned once that stimulus ceases for a period of time. Caribbean hermit crabs of the *Coenobita* genus were picked up, causing them to retract into their shells as a fear response. Once returned to their habitat enclosure, re-emergence times were recorded. As expected, hermit crabs exhibited conditioned responses due to the benign nature of the stimulus, emerging from their shells sooner with repeated exposure. Crabs were retested to see if they remained deconditioned after a two-week period of non exposure. The study contributes to our understanding of the behavior of hermit crabs and expands on existing knowledge of conditioning in various animal species. Results from this research may help with the study of animal behavior and responses to their environment.

Student Author: Alana Parsons

Faculty Author: Amanda Rollins

Program: Biology/Chemistry/Math/Physics

Title: The Impact Of Low Light On Activity In Male And Female Anole Lizards (*Anolis Carolinensis*). Lighting conditions are important in maintaining circadian rhythms and may impact activity levels differently in males and females. Melatonin production is high in dark conditions, and females produce more of this hormone than males. Melatonin is also suppressed in many vertebrates by low light conditions. Continuous low light pollution is present in urban environments, and animals are increasingly adapting to these environments. Male and female anole lizards, *Anolis Carolinensis*, were exposed to continuous dim lighting in a tilt cage to monitor 24 hour activity levels. We predicted a reduction in the overall activity levels of these lizards, with a greater impact in females.

Student Author: Eliana Tacoronte

Faculty Author: Amanda Rollins

Program: Biology/Chemistry/Math/Physics

Title: Microplastic Collection Method Comparison Carried Out Along Indian Run, East Todd's Fork and Todd's Fork Creeks

The purpose of this experiment is to test different methods of microplastic collection to see which method is most efficient. The sample sites for collection include Indian Run Creek, East Todd's Fork Creek, and Todd's Fork Creek. These sites are based upon the WAVE research program at Wilmington College. The different methods conducted include a mason jar collection, stationary sieve collection, combination collection using sieves and kick-netting, as well as a complete kick-netting method. Results show that the most efficient collection method is kick-netting when collecting both microplastics and macroplastics. This information is important for various reasons that include understanding the health of local creeks in Wilmington and knowing what methodology is most efficient to use in future research.

Student Authors: Bailey Pohlman, Kierstyn Schmidt, Alyssa Storer, and Eliana Tacoronte

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: Determination of In Vitro Antimicrobial Activities of *Daucus carota* and *Brassica oleracea* against Various Human Pathogenic Bacteria

Medicinal plants possess secondary metabolites that confer several therapeutic properties. *Daucus carota* L. subsp. *Sativus* L. (carrot) and *Brassica oleracea* var. *acephala* belong to Apiaceae and Brassicaceae families, respectively. They contain many phytochemical constituents recognized for their broad range of benefits in the medicinal, nutraceutical, and pharmaceutical industries. These metabolites have been identified as candidates that exert potentials against human pathogenic and antibiotic-resistant bacteria. Therefore, this study tested the antimicrobial activities of carrot and kale extracts against four human pathogens using disk diffusion (DD) and minimum inhibitory concentration (MIC) assays. Tetracycline and amoxicillin served as the positive control. The results from this study showed that both carrot and kale extracts can act as antimicrobial agents against four strains of human pathogenic bacteria which might be resistant to either tetracycline or amoxicillin. Metabolites from these plant extracts can be used in pharmaceutical and nutraceutical industries as oral supplements or as base product in the development of new and novel drugs.

Student Authors: Anya Demshar, Ava Hester, Abbigal Whitesell

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: Antimicrobial Activities of *Brassica oleracea* var. *italica*. and *Brassica oleracea* var. *botrytis* against three Gram negative and one Gram positive strains of pathogenic bacteria.

Brassica oleracea var. *italica* (broccoli), and *Brassica oleracea* var. *botrytis* (cauliflower) are both members of the Brassicaceae family of flowering herbaceous and shrub plants. They are both grown in various regions of the world, and are used for a variety of nutritional and medicinal activities. These plants received greater attention as a result of the huge amount of revenue generated from their harvest globally. Furthermore, there are a lot of studies on their medicinal and therapeutic activities. However, there is the need to understand the antimicrobial properties against pathogenic bacteria. These plant extracts were optimized using response surface methodology (RSM). The percentage yield was compared normal conventional methods while antimicrobial activities were carried out using Kirby-Bauer and antimicrobial susceptibility tests. The optimized extracts of broccoli and cauliflower can act as antimicrobial agents against Gram negative strains of human pathogenic bacteria.

Student Authors: Taylor Powell-Abbinante & WAVE Research Students

Faculty Authors: Amanda Rollins, Russ Kincaid

Program: Biology/Chemistry/Math/Physics

Title: Expansion of Hands-on Learning, Hands-on Living - WAVE Research Program First Quarterly Report
The WAVE Research Program is a newly established program through the Wilmington College Department of Biology. WAVE, also known as the (water assessment and vitality enhancement program) focuses on different types of testing to determine the overall water quality and possible pollutants of the sample sites surveyed. In total, there are 4 different farms being investigated with 6 totally different sample sites, with both downstream and upstream locations at both. Within these sample sites, macroinvertebrates, water chemistry, and bacteriological analysis was done. Macroinvertebrates were identified after collection within the lab by the WAVE research students and then later compiled to obtain the Stream Quality Index value per each sample site. Water chemistry analysis was done using collected water samples to analyze the concentrations of different chemicals using a LaMotte Smart 3

Colorimeter. Bacteriological analysis was conducted by program advisor Amanda Rollins using a standard membrane filtration manifold to obtain diluted concentrations feasible to count along gridded petri dish paper. In total, this research consists of our first quarterly report findings which consists of one round of macroinvertebrate and bacteriological analysis, and one round of water chemistry analysis.

Student Authors: Jorja Hazelwood, Sarah Wolfer

Faculty Author: Oladapo Fagbohun

Program: Biology/Chemistry/Math/Physics

Title: In vitro studies on the antimicrobial effects of optimized *Spinacia oleracea* L. and *Brassica Oleracea* var *capitata* extracts on strains of human pathogenic bacteria and its functional group determination
Spinacia oleracea L, commonly known as spinach, is rich in bioactive chemicals and antioxidative properties. *Brassica Oleracea* var. *capitata* also known as Cabbage, is known for its saponins and polyphenols. Together both Spinach and Cabbage are strong candidates for antimicrobial activity. tested optimized and solvent extracts of Spinach and Cabbage on inhibition zones and minimum inhibitory concentrations (MIC) of common multi-antibiotic resistant pathogenic bacteria: *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Escherichia coli*, and *Pseudomonas aeruginosa*. All pathogenic bacteria species tested were impacted negatively by both vegetable extracts. This suggests spinach and cabbage could be used as an alternative antimicrobial agent, which could be important to avoid harmful antibiotic drug side effects and drug resistance.

Student Author: Milain Burns

Faculty Author: Amanda Rollins

Program: Biology/Chemistry/Math/Physics

Title: Testing the Effectiveness of Different Toothpastes on Commonly Occurring Canine Oral Bacteria
Periodontal disease is one of the most common illnesses in dogs and affects roughly 85% of dogs above the age of four. In this experiment, the effects of three different toothpastes (each with different active ingredients) were tested on the canine oral microbiome. The main purpose behind this experiment was to determine if these dog toothpastes can effectively combat dental plaque buildup, and if they can, they could be used regularly on older dogs to prevent them from going through the risk of being anesthetized for a dental cleaning. To perform this experiment, bacteria that is commonly found in the mouth of both healthy dogs and in those with dental disorders was cultured and plated. Each bacterium was then treated with each toothpaste to determine which one(s) has/have a greater effect on the bacterial growth. Based on the results, the toothpaste that had the greatest effect on the growth of bacteria was Petrodex Enzymatic Toothpaste which contains the ingredients acidified calcium sulfate, citric acid, and vinegar which all show promising antimicrobial properties. By determining which toothpaste has a greater effect on the most commonly found oral bacteria, we could infer that if the bacteria that causes the dental disorders is affected by the toothpaste, then therefore the tarter/plaque will be affected in a way that will reduce both new and existing buildup.

Student Authors: Banesa Morales, Jenna Hilderbrant, Dylan Johnson

Faculty Author: Sara Myers

Program: Business Administration/Accounting

Title: Wilmington College Certification Program

This project is specifically only for Wilmington College students asking them regarding whether Wilmington should gain a certificate program. We will be talking about what would be popular courses if we were to gain a certification program, if students are even interested in gain the program, to see if students would be willing to pay to gain the program, and other topics regarding how we would gain the certification program.

Student Authors: Nicole Kessler, Peyton Tennis, Makayla Henry

Faculty Author: Sara Myer

Program: Business Administration/Accounting

Title: Clinton County Nonprofit Community Inclusion

Sugartree Ministries tasked our group to research people's positive or negative connotations towards supporting nonprofits in Clinton County. Our goal is to discover what the main reason towards people's interest or disinterest in donating is and whether it stems from financial/economic reasons or negative thoughts or feelings toward these programs. Our goal for the outcome of this study is to hopefully improve community perspective and levels of contribution. Sugartree is hoping to learn if they need to improve their public image or if it is more of a problem of economic issues.

Student Authors: Ryan Washburn, Luke Ruther, Riley Sims

Faculty Author: Sara Myers

Program: Business Administration/Accounting

Title: Wilmington College Facility Rentals Logos

Our project is recaching logos for the facilities at Wilmington college and finding and potentially creating the best logo for renting out college facilities

Student Authors: Dallas Rawlings, Gabe Dolen, and Phil Jarvis

Faculty Author: Sara Myers

Program: Business Administration/Accounting

Title: Esports at Wilmington College: If Esports is a profitable and obtainable area for Wilmington College to invest further in?

How can Wilmington College market Esports better to students on campus and incoming students? Our goal is to provide more information to our Esports club to create a more collaborative environment with Wilmington College in hopes this can expedite the progression of this program. Our project research includes: Observation of Esports lounge, focus group with students with and without interest in this field, secondary research of programs that have had success in Esports at the college/university level and professional level, and survey targeting Wilmington College students.

Student Authors: Philip Jarvis, Jack Sandberg, Blaise Morris, Kaitlyn Franklin

Program: Business Administration/Accounting

Title: Does GPA affect Technology

We got most of our data from students at Wilmington college to see if students' GPA get affected by Technology. The reason we did this is because we know that almost all college students have technology, so we wanted to see if there was difference in GPA if student who use a lot of technology compared to if students are not on technology as much. We asked a series of questions to get information back to see how people do with technology. Some of the questions that we asked were what your GPA is and gave a

range of numbers from 1.0 to 4.0. Then we asked what your major is to see if there was a difference in screentime from different majors. Then we asked how many hours a day do you spend on technology like your phone, TV, and video games. We asked which technology you use the most, like the TV and your phone etc. We asked if you played sports to see if your screentime is different from in you do not play sports. Last we asked if you worked to see if there is a difference from if you did not work. All the research that we have done this far is to find out if technology has affected students by getting their schoolwork done and turned in on time.

Student Authors: Kylee Schafer, Caitlyn Day, Zach Sizemore, Makayla Henry, Mackenzie Voges

Program: Business Administration/Accounting

Title: Customer Experience at Sit-Down Restaurants

For our research study, we conducted a survey and received 148 responses. This survey aimed to determine customer satisfaction at sit-down restaurants, determining whether people would prefer the quality of service or the time it takes to receive their food. On the survey, we asked a total of four main questions: what year the individual was born, what their top 3 favorite restaurants were, how many times a week they eat out, and whether they have a higher preference for quality or time it took to receive their food. The final question was given to add any further details that could contribute to a better sit-down experience. We opened the survey to individuals everywhere, sharing it on Wilmington's campus, with friends and family, and on social media. Our results from the study showed that a higher percentage of people preferred the quality of service from staff over the quality of time it takes to receive their food. In conducting this research, we hope to relay these responses to restaurants, further passing this information to managers to incorporate into their training protocol. This could allow waiters, waitresses, and staff key information on what customers look at in sit-down restaurants.

Student Authors: Michael Phillippe, Blake Haines, Cody Vanhooose, Luke Ruther

Program: Business Administration/Accounting

Title: Sleep and GPA

We conducted a Survey to determine if the amount of sleep a person got affects their GPA. We surveyed 52 different people and got a wide variety of different responses. The people surveyed were of many different backgrounds, genders, athletics and majors. We believe that the more sleep a person gets the better their GPA.

Student Authors: Kiana Chumley, Noah Honkomp

Faculty Authors: Nicole Wilkes, Parker Gunkel

Program: Social Sciences

Title: Crime Victim Compensation: A Content Analysis of States' Eligibility Requirements

Crime victim compensation (CVC) programs are available in each state to assist victims in recouping costs associated with victimization. While each state and Washington, D.C., have a crime victim compensation program, little is known about the states' policies surrounding eligibility requirements. This study aims to learn more about the eligibility requirements of each program through the use of a content analysis (n=51) of crime victim compensation programs' application materials, websites, and guidance documents. Variables related to eligibility, including requirements surrounding the filing of a police report, length of time since the crime occurred, cooperation with authorities, and criminal history, were all coded to assess each program's eligibility requirements. Preliminary results indicate there is variation in the eligibility requirements across programs. More specifically, there are differences in the time

requirements of reporting to police, presumptions of innocence in the crime event, involvement in co-occurring crimes, and location of the crime. Additionally, some CVC programs are not making some elements of eligibility known in their information. Implications of the preliminary findings suggest more information and transparency are needed about the eligibility requirements, to inform victims about their eligibility in the programs.

Student Author: Logann Julian

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: How Social Media Use and Self-Confidence Affects Female Athletes' Mental Health

Over the past few years mental health has begun to evolve, especially in the post pandemic world. Recently, there have been many athletes speaking out to tell their personal stories of how the balance between school, sports, and other aspects of life has taken a toll on their mental health. There are many components that make up one's mental health including one's emotional, psychological, and social wellbeing. Mental health also factors in an individual's way of coping with stressors of life. Social media also plays a big role in female athlete's mental health. My research shows you statistics on how social media and self-confidence affects female athletes' mental health.

Student Author: Shannon O'Boyle

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: Drowning Rates Among People in Ohio Counties Without Access to Swim Lesson Programs

Drowning is the lead cause of injury related death in children ages 1-4. It is also notable that children from low-income areas are far more likely to drown than children from high income areas. One of the greatest indicators of parents enrolling their children in swimming lessons is affordability and the belief that enrolling their children in swimming lessons is an important thing to do. So, because of this, this research looks at drowning rates compared to swimming lesson programs and socioeconomic factors in counties in the Southwest Region of Ohio in 2022. Existing data was used to find this information. The research I carried out was surprising and was not backed up by the literature I was basing my research on. The number of YMCAs with swimming lesson programs compared to the number of drownings per county had a positive correlation. The unemployment rate, income ranking, and income bracket compared to drownings per county all had negative correlations.

Student Author: Catrina Smith

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: CPTSD diagnosis in the United States

This project is on CPTSD (Complex post-traumatic stress disorder) and is a branch of PTSD. My research is based on figuring out the plausible reason as to why it is an undiagnosable mental illness in the United States. My research has consisted of interviewing someone who meets all of the criteria for CPTSD, and psychologists themselves on the disorder.

Student Author: Curtis Spangler

Program: Social Sciences

Title: The effects of overcrowding in prisons

My research project is about overcrowding in prisons and how that affects the prisoners and the guards. With the research that it is shown within you will see certain areas inside some of these overcrowded prisons that is lacking in areas. The information that is used for this project was exciting data from three different prisons. To keep the data honest, I have compared these overcrowded prisons to prisons at the correct capacity. The results that I have found will be shown on my poster board that will be displayed.

Student Author: Taylor Powell-Abbinante

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: Use of Agenda Setting in Media on Climate Change and Effects on Youthful Demographic's Trust in Scientific Data

This research study focuses on the impact of agenda-setting strategies in media, politics, and news on the topic of climate change and how it affects the ability to trust scientific data. To investigate this phenomenon, a survey was distributed to all Wilmington College students via email to analyze these strategies within their own personal lives. Questions ranged from political affiliation, degree of trust in scientific data, exposure to climate change information, and agenda-setting strategies. In total, these responses were then analyzed to determine the overall effects of agenda-setting strategies and the overall degree of trust in climate change data. Statistical tests were done to find correlation and statistically significant information from the data obtained from the distributed Qualtrics survey.

Student Author: Jodie Jennings

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: Red, White, Blue, and Green: A Closer Look at Poverty in the United States

Poverty has long been a topic of academic interest. Every year as more Americans confront the reality of living in poverty due to growing wealth inequality, proper evaluation of the status of poverty in the United States is urgently needed now. Despite this, because poverty in the United States can be traced back to food stamps (Chambers, 1982, p. 356), and the United States food industry is subsidized far more than any industry (aside from defense) and is therefore very stable, the metric used to measure the state of poverty in America is unreliable to define how much citizens may actually be struggling in today's economy. Other methods of measuring poverty have been researched in other countries, but rarely has research been done here that aims to define a more appropriate way of measurement. Prior research into this topic highlighted the idea of the Minimum Budget in Norway (Borgeraas and Dahl, 2019). Borgeraas and Dahl (2019) found this method, which included the social alienation aspect that comes with an impoverished circumstance, to be a far more accurate assessment of need than both the prior definitions of poverty it was tested against. This study, which asked Americans to build a Minimum Budget on their own, in a similar manner to the aforementioned Norwegian study, showed again that this idea of a Minimum Budget does a far better job at assessing the true state of poverty than the way poverty is defined by the U.S. government.

Student Authors: Noah Honkomp, Kiana Chumley, Liliann Williford

Faculty Authors: Nicole Wilkes

Program: Social Sciences

Title: An Analysis of Benefits Available through Crime Victim Compensation Programs

Crime victim compensation (CVC) programs are designed to assist victims in recovering costs associated with victimization. These programs tend to cover costs such as medical expenses, forensic clean-up, lost wages, and funeral expenses. Each state and Washington, D.C. have a crime victim compensation program; however, little research has been done on these programs to understand their operation and policies. The purpose of this study is to explore the benefits available to victims through CVC programs. A content analysis was conducted of crime victim compensation programs' materials (n=51); this study aimed to explore the benefits available to victims. Multiple variables surrounding CVC benefits were coded, including types of expenses covered, benefits available by type of expense, and maximum benefits available per victimization. Preliminary results indicate there is variation in CVC benefits provided by programs. For example, not all CVC programs cover moving expenses or childcare related to the victimization. Subsequently, there is variation in the maximum number of benefits available to victims per type of expense and some programs are not making this information available. Implications of the preliminary findings suggest more information and transparency are needed about benefits available to victims for them to navigate this system.

Student Author: Baylee Joy Martin

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: Demotivation and Academic Tracking: Ability Grouping, Sociometry, and Self Efficacy

School, a place not exclusively for academic learning, but also social and self-exploration. Tracking, streaming, and ability grouping in schools are meant to help students have an educational experience that is tailored to them. They are placed in classes according to their projected ability. This is to ensure that classes move at a pace that is best designed for the student to be able to succeed. However, are these practices actually harming students? Grouping students in these ways based on ability not only impose poor self-esteem but also impact social perceptions, and students' future track. Using Maslow's Hierarchy of Needs, we can see different angles in which grouping in this way might be actually imposing negative outcomes on students.

Student Author: Kaleb Stines

Faculty Author: Audrey Wagstaff

Program: Social Sciences

Title: Creative Activity in Relation to Production and Overall Mood

I ran a survey to further research potential correlations between participation in creative activity, and overall mood and productivity. The more research done in this field the closer we get to better fighting the mental health battle.

Student Author: Kwame Acheampong

Program: Social Sciences

Title: More Money, Less Problems

The goal of this research study is to explore how the perception of financial stability influences the prevalence of Common mental disorder (CMD) symptoms. Finances and mental health significantly affect all of our lives. CMD symptoms such as stress, anxiety, and depression are on the rise in the United States and much of the rest of the world. We often hear calls for greater access to clinical mental

healthcare treatment options and CMD awareness. However, some experts in the mental healthcare community do not see a benefit towards creating more treatment options than are currently available because we are not addressing the root cause of CMD: financial instability. A survey with three measures was conducted that gauged respondents' perception of financial stability, levels of depression, anxiety, and stress, and whether or not respondents felt inclined to seek clinical treatment for CMD symptoms. Results revealed that the less financially stable a respondent felt, the higher their CMD symptoms. In addition, someone who suffered from CMD symptoms would tend to prioritize improving their financial situation over improving mental health. Access to mental health services was not a significant barrier to treatment regardless of a respondent's perception of financial stability. These results support the argument that less energy and resources should be put into expanding clinical treatment options for CMD, and into fiscal policy aimed at improving the lives of poor and middle class individuals.