Senior Honors Thesis Presentations – Spring 2025
Location: Timken Natural Science Center (TNSC) 108

Date/Time	Presenters and Topics
Wednesday, March 19th 3:15pm – 4:45pm	**Ben Feick** "The Impact of Latin American Immigration on Crime in Ohio and Texas"
	Jacob O'Connor "Measuring Up: A Policy Analysis of Ohio's School District Report Cards"
	Mathew Bagatta "Does Dark Humor Work? A Deeper Inspection of Social Media Based Marketing Strategies"
Wednesday, March 19th 5:00pm – 6:30pm	**Noah Sample** "The Relationships Among Savings and Investment Behaviors, Risk Tolerance, and the Big Five Personality Traits of Young Adults"
	Tessa White "An Exploration of the Influence of Family and Socioeconomic Status on the Career Decision Process of Accounting Undergraduates Versus Other Areas of Study"
	Ryan Stahl "Building a Website to Increase Computer Science Literacy in Adolescent Students and Provide Related Career Options"
Thursday, March 20th 2:00pm – 3:00pm	**Eleanor Mondok** "Using Musical Training to Improve Working Memory in Children with Neurodevelopmental Disorders"
	Americo Levak "The Investing Habits of College Students"
Thursday, March 20th 3:15pm – 4:45pm	**Isabella Genovese** "Potential Effects of Caffeine Consumption on Balance and Sensory Skills in Sprinting Athletes"
	Kyle Woods "The Impact of Fatigue on Balance in Trained Long-distance Runners"
	Jillian Wiersma "Correlations Between Psychological and Physical Aspects Relating to Athletic Injuries"
Thursday, March 20th 5:00pm – 6:00pm	**Nicholas Kaluza Hauenstein** "Examining the Correlation Between Core Strength and Power Output in College Athletes"
	Lukas Keverkamp "Physiological Effects of Sodium Bicarbonate Ingestion via Maurten Bicarb on Endurance Running Performance"
Saturday, March 22 12:00pm – 1:30pm	**Heidi Kaczynski** "Observing the Impact of Coffee Brew Duration on Consumer Experience and Chemical Analysis of Arabica Coffee"
	Tatiana Tolson "How Assessment Design and Quality Matters Implementation Support Quality Assurance in Higher Education"

	Marina Foulk "Assessing the Impact of a New Streak Plate Practice Method on Undergraduate Microbiology Laboratory Students' Experience"
Saturday, March 22 1:45pm – 3:15pm	**Isabelle Rammel** "Darke County's 'Country Lawyers': Analyzing Rural Legal Landscapes & Cause Lawyering Classifications"
	Samuel Krakowski "The Efficiency of Price Convergence: A Historical Analysis of Value Investing Strategies"
	Dominic Gemma "Legal Issues and Artificial Intelligence"
Monday, March 24th 2:00pm – 3:00pm	**Ryan Hanzak** "SOX15 R104G Exhibits Reduced Nuclear Import"
	Matthew Voegele "Measuring Antibacterial Effects of Honey"
Monday, March 24th 3:15pm – 4:15pm	**Alexander Oswald** "Bioinformatics Analysis of Genes Connected to Autism Spectrum"
	Katelyn Bonar "Generation of a pHTC HaloTag® CMV-Neo Vector for the Expression of Novel SOX18 Variant F134V"
Wednesday, March 26th 3:00pm – 4:30pm	**Ashli Snider** "Back Down the Road: World War II in North Africa, 1942-1943"
	Maggie Lewis "The Molecular Sonification of Activin A Receptor Type I (ACVR1)"
	Gina Gildea "Enhancing Oral Health: Exploring the Impact of Polyphenolic Treatments on Dental Pellicle Formation and Erosion Protection"
Wednesday, March 26th 4:45pm – 6:15pm	**Nathan Lanham** "The Impact of Self- Regulated vs. Regulated Study Breaks on Recall Using Short Time Intervals"
	Madelynne Schweiger "Physical Therapy Management of a Subject with Multiple Sclerosis and Secondary Cardiovascular Pulmonary Conditions: A Case Study"
	Meghan Bosley "Ending Stigma in Adolescent Mental Health: Using Bibliotherapy and Other Teaching Strategies in a Ninth Grade English Linked Text Set"

Senior Honors Thesis Presentations – Spring 2025

Wednesday, March 19th
3:15 pm – 4:45 pm
Location: TNSC 108

Ben Feick
"The Impact of Latin American Immigration on Crime in Ohio and Texas"
Advisor: Carl Taylor, PhD, Associate Professor of Government and Foreign Affairs
Reader: Rachel Constance, PhD, Associate Professor of History

The topic of immigration is one of the most controversial and politicized topics in the modern United States. With both major political parties taking strong stances on the topic, most Americans have an opinion on the subject. Additionally, because of the controversy and politicalization surrounding the topic, some Americans believe that immigration, specifically from Latin America, has resulted in crime increasing in the United States. To test this, a correlational study was conducted using official U.S. government statistics from the U.S. Census Bureau and the Federal Bureau of Investigation's (FBI) Uniform Crime Report. By utilizing the statistical process of multiple linear regression, a correlation was able to be drawn, determining if there was any statistical significance between the population of foreign-born Latin Americans and crime rates in Ohio, Texas, and the United States as a whole. The results of this study show that there is a correlation of statistical significance between the increase of foreign-born Latin Americans and the decrease in crime in both Texas and the United States as a whole. However, it was also found that there is no correlation of statistical significance between the population of foreign-born Latin Americans and crime rates in Ohio. These results bring more evidence forward suggesting that Latin American immigration does not increase crime rates, although there is still a split among scholars on the topic.

Jacob O'Connor
"Measuring Up: A Policy Analysis of Ohio's School District Report Cards"
Advisor: Carl Taylor, Ph.D., Associate Professor of Government and Foreign Affairs
Reader: Rachel Constance, Ph.D., Associate Professor of History

Following the implementation of Ohio's new district report card system in 2023, it became of significance to determine whether or not this new system was better than the old system at achieving its three main goals: producing greater academic achievement, closing achievement gaps between the general student body and certain groups, and informing parents and communities of school district performance. The results indicated limited significance in the correlations between the change in system and changes in the achievement of those three main goals with two exceptions – the old system was associated with better improvement in a district's Performance Index score while the new system was associated with higher standardized test proficiency rates for economically disadvantaged students. Even these significant correlations, however, are better explained by other factors. Overall, the change in Ohio's school district report cards mostly failed in its goal to improve educational outcomes, and this illuminates a wider history of failure of such policies. Several recommendations for reform to greater improve academic achievement include adopting a state-district collaborative standardized test system similar to the defunct Nebraska STARS program and to more directly address the impacts of non-school factors like poverty and cultural differences.

Mathew Bagatta
"Does Dark Humor Work? A Deeper Inspection of Social Media Based Marketing Strategies"
Advisor: Philip Kim, DSc, CISSP, CISA, Associate Professor of Business
Reader: Julie Szendrey, DBA, CDMP, PCM, Professor of Business

This study looks into the effectiveness of dark humor in social media marketing by analyzing the consumer sentiment and engagement rates across three different platforms, namely YouTube, TikTok, and Facebook. By analyzing the advertisements produced by companies like Mint Mobile, Doritos, and Dr. Squatch, the research compares how dark humor and non-dark humor strategies impact the overall audiences' reactions and interactions. Using Data from YouTube, TikTok, and Facebook to conduct a sentiment analysis test and engagement rate calculation, it is revealed that dark humor can drive higher engagement on the platforms that strive to have visually engaging content, all the while traditional humor is better received on a platform such as Facebook. The study highlights the importance of having an advertisement humor that falls in line with the brand identity, as well as the expectations of the audience being marketed towards.

Wednesday, March 19th
5:00 pm – 6:30 pm
Location: TNSC 108

Noah Sample
"The Relationships Among Savings and Investment Behaviors, Risk Tolerance, and the Big Five Personality Traits of Young Adults"
Advisor: Julie Szendrey, DBA, CDMP, PCM, Professor of Business
Reader: Ashley Monaco, CPA, CFE, MSA, Professional Assistant Professor of Accounting

"Decision making can be described as a process which means choosing one of many alternatives. Financial investors choose from many financial assets during the decision making" (Bayar, 2013, p. 2). There are several factors that can alter the decisions that individuals make in the stock market. The act of investing in the financial markets can be portrayed by uncertainty and risk, "which means that the impact of affective states and moods increases, and that investors are more likely to rely on affective heuristics in making judgments about financial information" (Nekrasova, 2011, p. 9). The emotions of the investor can influence the risk tolerance towards a certain investment. Individuals evaluate decisions based on the potential outcomes that they see could occur (Stone et al., 2002). In investing, a lot of the decisions being made come from the emotions of the investor or from outside sources that are influencing the decision.

To explore the relationships between variables, an online survey was used to collect data from students attending Walsh University with a sample size of n = 124. The variables upon which data were collected were age, gender, whether the individual was a college athlete, financial management behaviors, risk tolerance, and the Big Five personality traits. After performing descriptive statistics, data analysis from the survey results was used to test the research hypothesis statements. Results indicated support for two of the proposed hypotheses, including one personality trait as well as relationships between gender and risk tolerance. Further researchers may consider expanding upon this study to a larger sample of young adults.

Tessa White
"An Exploration of the Influence of Family and Socioeconomic Status on the Career Decision Process of Accounting Undergraduates Versus Other Areas of Study"
Advisor: Julie Szendrey, DBA, CDMP, PCM, Professor of Business
Reader: Ashley Monaco, CPA, CFE, MSA, Professional Assistant Professor of Accounting

This study examines the influence of family and socioeconomic status on the career decision-making processes of accounting undergraduates compared to students in other fields. Despite a positive job outlook for accounting, enrollment has declined, necessitating an understanding of the factors affecting students' major choices. Through a survey of current undergraduate accounting students based on pre-existing literature and scales, the research reveals how family dynamics and socioeconomic factors impact accounting students. These findings aim to inform academic institutions on recruitment strategies and programming to better support accounting majors by addressing their unique influences while also exploring openings for further research.

Ryan Stahl
"Building a Website to Increase Computer Science Literacy in Adolescent Students and Provide Related Career Options"
Advisor: Jennifer Vokoun, BFA, MA, MFA, Associate Professor of Graphic Design
Reader: Jennifer Green, BA, MAEd, PhD, Assistant Professor of Education

In today's age of technological dominance, the field of computer science is quickly expanding and gaining popularity. Almost every business has a computer science department and is looking for new hires. Furthermore, schools have begun teaching computer science skills to students at younger ages to prepare them for the job market they will eventually face. Many resources on the internet are available that teach a variety of computer science skills to users, such as programming, cybersecurity practices, software development, and many more. However, very few resources exist that recommend computer science occupations to users based on their areas of interest in the field. This creative project attempts to fill this gap by creating a website that both teaches computer science skills and offers careers to users based on the content in those lessons.

Thursday, March 20th
2:00pm – 3:00pm
Location: TNSC 108

Eleanor Mondok
"Using Musical Training to Improve Working Memory in Children with Neurodevelopmental Disorders"
Advisor: Michele Tilstra, PhD, OTD, OTR/L, CHT, Program Director and Associate Professor of Occupational Therapy at University of Western States
Reader: Randy Rair, PhD, Assistant Professor of Education

Children with neurodevelopmental disorders often experience a deficit in working memory (WM), which affects their daily functions, particularly in areas of attention, organization, comprehension, learning, and problem-solving. Although controversial, some studies have found that WM can be improved in children with neurodevelopmental disorders. Musicians tend to have a larger WM than non-musicians, and musical training has been found to improve WM in children with neurodevelopmental disorders. Using evidence supporting the benefits of musical training to

improve WM for children with neurodevelopmental disorders, the author designed a piano program called *Keyed In on Working Memory*. The program contains a lesson book with WM training games, a YouTube channel providing audio and video, a deck of flashcards, and various game pieces for the WM training games. As structured games are an efficient way to improve WM while maintaining attention, 17 WM training games of ten different types have been included in the program in addition to several mini challenges designed to strengthen certain aspects of WM. The author believes this to be the first piano lesson book to focus solely on improving WM while learning how to play the instrument.

Americo Levak
"The Investing Habits of College Students"
Advisor: C. Chase Senk, JD, Associate Professor of Business
Reader: Randy Rair, PhD, Assistant Professor of Education

The stock market is something that consists of trades, shorts, puts, calls, and options being exchanged every day, hour, minute, and second. It can come off intimidating to start, but once the correct methods are discovered to understand the correct methods to be successfully active in it, the impacts that it has are second to none. With that great power comes the need to be responsible and smart when making these choices that involve real money. College students especially need to be cautious when investing but it is something that needs to be exercised as early as possible to maximize the gains that it provides. The goal of this study is to provide sufficient evidence that shows that investing needs to be taught earlier in academia. Furthermore, the goal of the study is to show the lack of knowledge in investing that is present in college students of various school disciplines. This was done by analyzing a survey consisting of various questions that pertain to the investing habits, or lack thereof, of college students at Walsh University. From those survey responses, six Chi-Square analyses were conducted to further strengthen the argument that there needs to be a heavier emphasis on the teaching of the numerous advantages of the stock market. Upon completing these analyses, there was overwhelming support surrounding the need for investing to be added to general curriculums, in academia around the world and could contribute to alike students in the future.

Thursday, March 20th
3:15 pm – 4:45 pm
Location: TNSC 108

Isabella Genovese
"Potential Effects of Caffeine Consumption on Balance and Sensory Skills in Sprinting Athletes"
Advisor: Jonathan Naylor, PhD, ACSM-CEP, Associate Professor of Exercise Science
Reader: Kelsey Scanlon, PhD, Program Director and Chair of Exercise Science

Caffeine is a popular ergogenic aid that over 80% of the population uses daily. It alters physical behavior and performance, brain functions, and emotional status. While caffeine can be used for positive reasons, it has potential negative effects, like habituation. A specific portion of caffeine consumers are athletes. Over 45% of athletes utilize energy drinks alone. Athletes can consume caffeine to enhance performance, reduce pain, offset fatigue, and increase muscle contraction frequency. Previous studies have shown that caffeine can account for a possible advantage on competition days. However, its effect on balance and sensory skills is unknown. Balance is feature

that can set athletes apart from one another, as having significantly better sensory skills is an advantage when performing. Previous studies have not been able to fully determine caffeine's effects on balance, and have never utilized athletes when doing so. This is a gap in research, as no study has been done to incorporate all three main topics. This study aimed to determine (1) what effects, if any, caffeine has on balance and sensory skills in collegiate sprinting athletes and (2) if caffeine habituation will nullify any possible caffeinated effects while performing balance and sensory skill testing. In this single-blind study, thirteen Walsh University Track & Field athletes that specialized in sprinting based events took a condensed version of the CaffCo survey, and completed two NeuroCom Balance Master tests to evaluate balance and sensory skills. The tests were done on two trial days, and each participant completed one trial with caffeine (3 mg/kg^{-1}) and one with a placebo. A paired-samples t-test and two-way ANOVA showed no significant differences when assessing their composite scores ($p > 0.05$). Thus, it can be concluded that (1) caffeine did not have effects on balance and sensory skills in collegiate sprinting athletes and (2) caffeine habituation did not have nullifying effects when testing balance and sensory skills.

Kyle Woods
"The Impact of Fatigue on Balance in Trained Long-distance Runners"
Advisor: Jonathan Naylor, PhD, ACSM-CEP, Associate Professor of Exercise Science
Reader: Kelsey Scanlon, PhD, Program Director and Chair, Exercise Science

Fatigue stands as an incredibly important indicator of running economy in highly trained athletes. It is well understood that fatigue has a negative effect on performance, but it is unclear how exactly fatigue impacts balance. The goal of this study was to determine the effect of fatigue on balance after a period of moderate exercise in a sample of trained college distance runners. To examine this possible effect, 17 members of the Walsh University Cross Country teams were studied. The participants first completed two pre-exercise balance tests, consisting of a Unilateral Stance Test (US) and an Adaptation Test (ADT) on the NeuroCom Balance Master. Participants then completed a moderate intensity endurance run of 45 minutes on a treadmill at a pace determined by the Karvonen method at 65-75% of the participant's Heart Rate Reserve (HRR). Post-exercise, balance tests were then repeated. Paired samples t-tests were performed to determine if there was a significant effect of fatigue on any of the tested balance conditions. Interestingly, most of the data was deemed insignificant, however, both the Toes Up and Toes Down conditions of the ADT show significant improvement in the post-exercise test from the pre-exercise test (Toes Up $t = 6.735$, $p < .001$; Toes Down $t = 2.750$, $p = .014$; ADT $t = 2.198$, $p = .043$) ($p \leq 0.05$). The results of this study indicate that balance capabilities may actually improve post-exercise rather than decrease. Future studies should focus on exercising participants at a more vigorous intensity in order to ensure that they are fatigued enough.

Jillian Wiersma
"Correlations Between Psychological and Physical Aspects Relating to Athletic Injuries"
Advisor: Jonathan Naylor PhD, ACSM-CEP, Associate Professor of Exercise Science
Reader: Meredith Joplin PhD, ACSM-EP, Assistant Professor of Exercise Science

Objective: The objective of this study was to determine the relationship between psychological and physical aspects of athletic injuries. Methods: The study was performed on 16 Walsh University athletes (8 male, 8 female, 20.13 ±1.41 years). All participants were between the ages of 18 and 23 and receiving treatment for an athletic injury. Participants were from 4 different teams, including men's soccer, women's soccer, men's basketball, and women's volleyball. Participants underwent evaluations for their physiological health with a heart rate variability (HRV) monitoring session and

their mental health via a survey. Results: Results were split into three separate models with different variations of criterion and predictor variables. Model One used the criterion of rehabilitation time and the predictors of athletic identity, fear of reinjury, sense of belonging, depressive symptoms, and anxiety symptoms. Model Two used the same predictor variables with the criterion of time since injury. Model Three had the criterion of heart rate variability with all of the psychological predictors listed above along with rehabilitation time and time since injury. None of the models proved to be statistically significant, however, it is important to note that data was nearing significance between depressive symptoms and rehabilitation time as well as with time since injury. This suggests a possible correlation between depressive symptoms and injury longevity, however, further research with larger sample sizes must be done to further investigate these relationships.

Thursday, March 20th
5:00 pm – 6:00 pm
Location: TNSC 108

Nicholas Kaluza Hauenstein
"Examining the Correlation Between Core Strength and Power Output in College Athletes"
Advisor: Meredith Joplin, PhD, ACSM-EP, Assistant Professor of Exercise Science
Reader: Jonathan Naylor, PhD, ACSM-CEP, Associate Professor of Exercise Science

Objective: Determine if there is a correlation between core strength and power output in collegiate athletes. *Methods*: Recruited 26 (16 male and 10 female) DII collegiate athletes to participate in the study. Participants engaged in core strength and power output testing. Four core tests were administered to every participant, including horizontal side plank test (right and left), hip flexor endurance test, back extensor endurance test, as well as two tests for power: countermovement jump test and barbell bench press test. A barbell bench press one rep max test was administered in between core testing and power output testing only by participants lacking a recent one rep max barbell bench value. Each of the five original tests were demonstrated and then performed twice by the participant. Pearson's correlations were run to analyze the data. *Results*: Correlations demonstrated a significant relationship between the back extensor test and the barbell bench test average power ($r = -.433$, $p = .027$), while all other tests revealed no significant relationship. *Conclusion*: There may be a weak relationship between core strength and power output among our current sample of DII collegiate athletes. Therefore, research with larger samples in a variety of populations should be done looking at the correlation between core strength and power output to determine if one exists amongst athletes.

Lukas Keverkamp
"Physiological Effects of Sodium Bicarbonate Ingestion via Maurten Bicarb on Endurance Running Performance"
Advisor: Kelsey Scanlon, PhD, Program Director and Chair of Exercise Science
Reader: Meredith Joplin, PhD, ACSM-EP, Assistant Professor of Exercise Science

There is a wide range of research examining the use of sodium bicarbonate as a performance enhancing supplement, however there is limited research regarding endurance runners specifically, and little to none using the product Maurten Bicarb System. The goal of this study was to determine how Maurten Bicarb System, a sodium bicarbonate product, effects the performances and gastrointestinal systems of endurance runners. To test these factors, eight members (four men, four women, aged 19-22) of the Walsh University Cross Country and/or Track and Field teams were studied. The participants each completed two trials involving treadmill running intervals slightly

faster than their predicted lactate threshold pace. The participants consumed sodium bicarbonate before one of their two trials. Before and after each trial, participants completed a survey querying the state of their gastrointestinal system. Participants' respiratory exchange ratio (RER), rate of perceived exertion (RPE), heart rate (HR), and blood lactate were also measured multiple times throughout each trial. One-way ANOVAs with repeated measures were used to determine if there was a significant change in performance measurables between the two trials. A two-way ANOVA was used to analyze main effect of time and condition for participants gastrointestinal system. These findings suggest that Maurten Bicarb System yielded no significant change ($p > 0.05$) in respiratory exchange ratio, rate of perceived exertion, heart rate, and blood lactate, meaning performance was not enhanced. Additionally, participants saw no significant change ($p > 0.05$) change in GI symptoms comparing pre-exercise to post-exercise. These results suggest Maurten Bicarb system successfully eliminates gastrointestinal distress commonly associated with sodium bicarbonate ingestion. These results also reiterate the need for expansive research regarding the effectiveness of sodium bicarbonate as a performance enhancing supplement.

Saturday, March 22
12:00 pm – 1:30 pm
Location: TNSC 108

Heidi Kaczynski
"Observing the Impact of Coffee Brew Duration on Consumer Experience and Chemical Analysis of Arabica Coffee"
Advisor: Amy Heston, PhD, Professor of Inorganic Chemistry
Reader: Timothy Smith, PhD, Assistant Professor of Organic Chemistry and Physics

Coffee is an important beverage to individuals worldwide. Some drink it the moment they wake, while others drink it to avoid sleep in order to meet a deadline. Coffee's addictive stimulant effect keeps consumers coming back for more, and through the drive-thru. Inspired by my service work at McDonald's, it is important to explore Arabica coffee and the effects of beverage quality. Many times, during the breakfast rush, comments from customers such as "This coffee tastes old…fresh…stale…not hot enough" have been said. The purpose of this project is to determine consumer feedback on coffee brew duration with respect to oxidation and caffeine content of Arabica coffee in hopes to improve customer experience. Two coffee samples and 62 consumers at or near the Walsh University campus were analyzed in a two-part study: a laboratory and consumer evaluation. Coffee samples, one fresh and one 8-hour sample, were analyzed using UV-Vis spectroscopy and LCMS instrumentation. Results demonstrated the stability of caffeine in the sample on the LCMS with caffeine concentrations of 245-246 ppm, while an oxidation of the samples was predicted on the UV-Vis at a wavelength range of 240-270 nm. Consumer observations of coffee samples with an 8-hour brew duration difference gave insight into consumer traits and values of beverage quality. There was an overall favorability of the 8-hour coffee sample in the study, but consumers were split evenly between which sample was perceived as the "fresh" sample. Consumer emotion and free response feedback demonstrated a consumer value of "bitterness" and "sharpness of taste." The connection between chemistry and consumer satisfaction was analyzed to bring insight into consumer dissatisfaction.

Tatiana Tolson
"How Assessment Design and Quality Matters Implementation Support Quality Assurance in Higher Education"
Thesis Advisor: Amy Heston, PhD, Professor of Chemistry
Reader: Neil Walsh, PhD, Associate Professor of Chemistry

In an effort toward continuous improvement of the chemistry program, this research project focused on the assessment of student achievement in Principles of Chemistry I Laboratory (CHEM 101L). The selected Program Student Learning Outcomes (PSLOs) were using critical thinking to solve problems and demonstrating knowledge in core laboratory skills. Student achievement was evaluated for two labs: Sodium on a Pretzel and Volumetric Analysis of Vinegar. Assessment data, based on a 3-point scale, indicated that most students (N=47) were meeting or exceeding the standard of 2.0. A total of 376 artifacts were evaluated in this study and revealed the mean values for the pretzel lab (2.11) and vinegar lab (2.18). Results indicated that the majority of students were meeting or exceeding the standard (2.0-3.0) for explaining the processes of sodium analysis and titration techniques. Conversely, some responses showed that learners were not quite meeting the standard of 2.0. Some examples included chemical measurement, explaining the purpose of an indicator, and writing formulas. Therefore, a plan was created to enhance learning in these areas including adding new instructional materials into the lesson such as video content for visual learners. This content was analyzed for accuracy, effectiveness, and accessibility and then proposed for implementation into the course in alignment with Quality Matters (QM) standards. These efforts will enhance the learning experience for future CHEM 101L students. Furthermore, this project allowed for student partnership in chemistry assessment and connected to the institution's mission by developing innovative leadership as the first student to pioneer QM initiatives. Another unique result of this project was student leadership in quality assurance, an institutional strategic goal for ensuring the quality of program offerings.

Marina Foulk
"Assessing the Impact of a New Streak Plate Practice Method on Undergraduate Microbiology Laboratory Students' Experience"
Advisor: Darlene Walro PhD, Professor of Biology
Reader: Thomas Freeland PhD, Professor of Biology

The streak plate technique is an essential skill taught in undergraduate microbiology laboratory courses. This study sought to discover if the paint-and-cardstock streak plate practice method introduced by Grace L. Axler-DiPerte had a positive impact on students' theory comprehension, skill performance, ability confidence, and difficulties experienced when incorporated into their streak plate lesson. Fifteen students from two sections of Microbiology Lab entered the study, and their classwork (two nongraded quizzes and streak plate performance assessment) was examined to evaluate the practice method. One section received the practice method and the standard streak plate lesson, and the other section received only the standard lesson. Comparison of the two groups of nongraded quizzes completed by participants indicated that the practice method did not cause an increase in understanding or ability confidence, but it may have caused a decrease in difficulties experienced while carrying out the skill. Participants' streak plates were scored on four criteria, and five unpaired t-tests were performed to compare the scores on each criterion and total plate scores. The calculated p values for all t-tests were greater than 0.05, which indicated that the paint-and-cardstock practice method did not have a significant impact in improving students' streak plate performance. Therefore, the data did not support the hypotheses that participants who experienced the practice method would demonstrate a better understanding of the theory underlying the

technique, be more successful in their streak plate performance assessment, or indicate higher levels of ability confidence. The data supported the hypothesis statement that participants who experienced the practice method would indicate lower levels of difficulty with elements of the streak plate procedure.

Saturday, March 22
1:45 pm – 3:15 pm
Location: TNSC 108

Isabelle Rammel
"Darke County's 'Country Lawyers': Analyzing Rural Legal Landscapes & Cause Lawyering Classifications"
Advisor: Carl Taylor, PhD, Associate Professor of Government & Foreign Affairs
Reader: C. Chase Senk, JD, Associate Professor of Business

Many rural populations face significant barriers to accessing important amenities. Ohio's rural citizens have similar barriers in meeting their legal needs; 81 of Ohio's 88 counties are considered "underserved" by the American Bar Association. This qualitative case study examines the experiences and perspectives of seventeen attorneys practicing in rural Darke County, Ohio, to explore the dynamics of exurban legal practice and its alignment with existing cause lawyering frameworks. The research investigates themes such as attorney shortages, local collaboration, and the unique challenges of practicing in underserved rural areas. Findings highlight the critical role of personal connections, local reputation, and collaboration in sustaining rural legal systems, although shrinking Bar numbers are raised as a primary concern. The research also investigates cause-lawyering identifications along the metrics of attorney motivations, practice settings, goals, and strategies. Responses indicate shared values of service and community, positioning many participants within the framework of individual-focused cause lawyering. However, familial motivations also emerged as significant drivers for rural practice, complicating a strict categorization. Study findings underscore the importance of addressing recruitment challenges, supporting legal aid initiatives, and fostering local engagement in rural legal landscapes.

Samuel Krakowski
"The Efficiency of Price Convergence: A Historical Analysis of Value Investing Strategies"
Advisor: C. Chase Senk, JD, Associate Professor of Business
Reader: William Davis, PhD, Associate Professor Government and Foreign Affairs

The following thesis examines the efficiency of price convergence with intrinsic value, specifically through the lens of value investing. Warren Buffett's time at Berkshire Hathaway acts as the primary vessel for data analysis and concluding assessment. Despite the rise of algorithmic trading, short-term speculation, and a continuously decreasing investor time horizon, value investing has endured. Value investing is rooted in fundamental analysis and art of valuation, built on the basis that there is more to a stock than simply numbers on a screen, that it is a piece of a larger business. Many value investors have deployed this strategy to achieve exceptional market-beating returns over long period of time including but not limited to Warren Buffett, Charlie Munger, Bill Ackman, Monish Pabrai, and Li Lu. Through in-depth analysis of nine case studies of Buffett's investments, such as Apple, American Express, and Visa, this research was conducted to determine whether stock prices reliably converge to intrinsic value over time.

A historical discounted cash flow model is utilized to determine intrinsic value at the time of Buffett's initial purchase. Sequentially, statistical analyses such as correlation and regression models are conducted in order to assess the relationship between market capitalization and value. The results indicate a strong positive correlation, with a significant amount of variation in market capitalization being explained by intrinsic value. The average time was 3.5 years for prices to align with intrinsic value, and Buffett achieved an average annualized return of approximately 23% during this period. These findings reinforce that disciplined value investing can allow investors to capitalize on short-term inefficiencies driven by behavioral biases to generate superior long-term returns.

Dominic Gemma
"Legal Issues and Artificial Intelligence"
Advisor: Mark Rogers, PhD, Professor of Communications
Reader: C. Chase Senk, JD, Associate Professor of Business

This thesis explores the intersection of artificial intelligence (AI) and intellectual property (IP) law, examining how the rapid development of AI technologies is to be regulated under the body of law that exists in 2024. Ambiguity in how companies are allowed to use intellectual property in development for ai creates uncertainty for both creators and innovators. By analyzing key legal cases, statutes, and scholarly perspectives, the thesis identifies the gaps in IP law that hinder effective regulation of AI of some presently ongoing issues. This paper also examines how the use of intellectual property law as a regulating force in AI could be putting a strain on the legal system, and how more tailored laws passed through legislative action will be necessary to properly develop AI and protect creators of intellectual property.

Monday, March 24th
2:00pm – 3:00pm
Location: TNSC 108

Ryan Hanzak
"SOX15 R104G Exhibits Reduced Nuclear Import"
Advisor: Adam Underwood, MS, PhD, Professor of Biology
Reader: Timothy Smith, PhD, Assistant Professor of Chemistry

SOX (SRY-related HMG-box) proteins are transcription factors that serve as key homeostatic regulators of cellular differentiation and organogenesis. All 20 SOX proteins have a highly conserved DNA binding domain known as a High Mobility Group-box (HMG-box), allowing SOX proteins to bind to the same target consensus DNA sequence. HMG-box binding to target DNA sequences induces a 50-80° bend that alters DNA architecture, leading to either the upregulation or downregulation of gene expression. While the exact mechanism directing SOX protein interactions at the minor groove of DNA is not entirely defined, it is suggested that SOX binding specificity is reliant on interactions with binding partners through protein-protein interactions (PPI). Additionally, these interactions are believed to be controlled by post-transitional modifications (PTMs) such as phosphorylation, acetylation and SUMOylation. These PTMs not only regulate PPI, but also give SOX proteins specificity and can enhance or diminish HMG-box binding affinity to the target DNA sequences. Mutations in SOX genes are implicated in numerous cancers, sex reversal, cardiovascular diseases, and neurological issues. SOX15, an under-studied member of this family, is shown to modulate stem cell pluripotency in concert with SOX2 and regulate myogenesis. Our research has identified a SOX15 variant, that exchanges an arginine (R) with a glycine (G) at residue 104 (R104G) in the HMG-box's

third alpha helix. The biological implications of this mutation are unknown and are predicted to possibly impact muscle development. The purpose of this project was to generate native and mutated SOX15 expression constructs to be used in experiments that assess the potential derangement of SOX15 function due to the R104G amino acid exchange. In this project one such alteration in SOX15 cellular activity was a reduction in nuclear localization. This was determined through fluorescent microscopy with covalently tagged SOX15 and SOX15R104G followed by western blot analysis of SOX15 transfected HeLa cell lysates subjected to nuclear/cytoplasmic isolations to confirm aberrant SOX15R104G cellular localization relative to native SOX15.

Matthew Voegele
"Measuring Antibacterial Effects of Honey"
Advisor: Darlene Walro, PhD, Professor of Biology
Reader: Jennifer Clevinger, PhD, Professor of Biology

Antimicrobial resistance is an increasing global health threat, necessitating the exploration of natural alternatives to conventional antibiotics. Honey, widely recognized for its medicinal properties, has demonstrated antibacterial activity against a range of bacterial species. This study evaluates the antibacterial effects of honey extracts on Gram-positive (*Staphylococcus aureus, Staphylococcus epidermidis, Bacillus spizizenii*) and Gram-negative (*Escherichia coli, Salmonella typhimurium*) bacteria. Honey extracts at concentrations ranging from 0.05 g/mL to 0.003125 g/mL were tested using fluorescence-based turbidity analysis and agar diffusion assays to measure bacterial growth inhibition. Results demonstrated a strong dose-dependent relationship, with bacterial inhibition nearing 100% at 0.05 g/mL for all strains. *Salmonella typhimurium* exhibited consistently high inhibition across all concentrations, maintaining over 50% inhibition even at 0.00625 g/mL, while *Bacillus spizizenii* showed a sharp decline in inhibition below 0.025 g/mL. *Staphylococcus aureus* and *S. epidermidis* followed similar inhibition trends, with unprocessed honey demonstrating the highest antibacterial activity, reducing *S. aureus* growth by 82% at 0.0125 g/mL. Interestingly, *E. coli* exhibited a steady decline in inhibition across all concentrations. No clear pattern emerged favoring either Gram-positive or Gram-negative bacteria, suggesting that honey's antibacterial properties are influenced more by bacterial species and honey composition than by cell wall classification. These findings highlight the role of bioactive compounds in honey, such as hydrogen peroxide, phenolic compounds, and methylglyoxal, in bacterial inhibition. While honey extract shows promise as a natural antibacterial agent, further research is necessary to refine detection methods, explore synergistic interactions with conventional antibiotics, and evaluate its potential in clinical applications.

Monday, March 24th
3:15pm – 4:15pm
Location: TNSC 108

Alexander Oswald
"Bioinformatics Analysis of Genes Connected to Autism Spectrum"
Advisor: Thomas Freeland, PhD, Professor of Biology
Reader: Adam Underwood, PhD, Professor of Biology

Between 100 and 800 genes have been identified as potential links to Autism Spectrum Disorder (ASD) which presents difficulties in characterizing each protein's role in the condition, which of them are false positives, and the extent to which each may contribute to the condition. Further, there is the potential to omit genes of potential relevance. Novel methods of filtering long lists of candidate genes can be used to identify strongly-influencing genes from among extant genome-wide association data on ASD. This project utilized our "Bryan & Clare Protocol" to identify the sulfamidase enzyme N-sulfoglucosamine sulfohydrolase (SGSH) as a contributor to ASD expression and proposes how variants in the SGSH enzyme may be altered in function in ways that contribute to the ASD phenotype.

Katelyn Bonar
"Generation of a pHTC HaloTag® CMV-Neo Vector for the Expression of Novel SOX18 Variant F134V"
Advisor: Adam Underwood, PhD, Professor of Biology
Reader: Thomas Freeland, PhD, Professor of Biology

SOX (SRY-related HMG-box) proteins are pioneer transcription factors (TFs) that play a central role as regulators of cellular differentiation and the development of organs. Mutations within SOX proteins are linked to numerous developmental abnormalities within the cardiovascular, skeletal, reproductive and nervous system in addition to many forms of cancer. All 20 SOX proteins encoded in the human genome contain a conserved 82 amino acid High-Mobility Group Box (HMG-box) DNA binding domain composed of three alpha helixes that allow these proteins to interact with and control the transcription of target genes. Our group has identified a unique mutation within the third alpha helix of the SOX18 HMG- box that exchanges a phenylalanine (F) for a valine (V) at amino acid 134. The purpose of this project was to produce an expression vector that can be used to produce the SOX18 F134V protein variant which can be used to evaluate the impact of this amino acid exchange on SOX18 function. The hypothesis test was; The SOX18 F134V expression vector when transfected into HeLa cells will produce the Halo-tagged SOX18 F134V fusion proteins. To test this hypothesis the *SOX18* protein coding region, previously cloned into the Promega pHTC HaloTag® CMV-neo vector (pHTC/SOX18Halo), was mutated at nucleotide 402, replacing a thymine (T) with a guanine (G) using 5' phosphorylated mutation PCR (polymerase chain reaction) primers that copied the entire pHTC/SOX18Halo vector while adding the "G" DNA mutation. Agarose gel electrophoresis was used to confirm the PCR reaction occurred. The amplicons were then ligated to re-circularize the new pHTC/SOX18-F134V-Halo DNA construct. The incorporation of the mutation was confirmed through sequence analysis and expression of the Halo-tagged SOX18 F134V fusion proteins in transiently transfected HeLa cells. Protein expression was confirmed by both Halo ligand-Oregon Green live cell staining and western blot. Results confirmed expression and that SOX18 F134V proteins localize to both the nucleus and cytoplasm, while native SOX18 is only present in the HeLa cell nucleus. This work can be continued by doing a luciferase assay to determine if transcriptional activity of this mutant is also affected.

Wednesday, March 26th
3:00 pm – 4:30 pm
Location: TNSC 108

Ashli Snider
"Back Down the Road: World War II in North Africa, 1942-1943"
Advisor: Rachel Constance, PhD, Associate Professor of History
Reader: Seth Hepner, EdD, Assistant Professor of English, Director of General Education Program

"Back Down the Road" adds a unique perspective to the repertoire of World War II literature by amplifying the voices of the soldiers who fought on the front lines. It examines the campaign in North Africa from the personal experiences of these soldiers, offering an on-the-ground view historically overshadowed by the narratives of generals and political leaders. It utilizes a range of sources, including diaries, newspaper articles, BBC interviews, and other documents to highlight the daily lives and experiences of regular soldiers during the campaign. There is a special focus on the unpublished memoirs of 2nd Lieutenant Charles Vance Snider Jr., the author's great grandfather, which detail life in war-torn North Africa, from daily chores to heated combat. By centering Snider, and the experiences of thousands of soldiers like him, this project seeks to give them the recognition they deserve and provide a more complete and humanized account of this campaign.

Maggie Lewis
"The Molecular Sonification of Activin A Receptor Type I (ACVR1)"
Advisor: Thomas Roblee, Professional Assistant Professor of Music and Director of Bands
Reader: Thomas Freeland, PhD, Professor of Biology

Molecular sonification is the process by which molecules are condensed into data and then transposed into an audio format for the audience to enjoy and analyze. As literature develops on this subject, possibilities for musical applications of sonification continue to expand, leading to innovative works. Many existing works focus on scientific applications and widen the gap between science and music. "Percussive Pathways: ACVR1 in Motion " attempts to close the gap using scientific data and musical entries that everyone can enjoy. The piece was developed through a sonification process and features three percussionists on instruments of their choice. Performers will sonify the structure of Activin A Receptor Type I (ACVR1) with an entertaining entry of data that will suit every audience. This creative project intends to connect science and music to make it more accessible and enjoyable for all.

Gina Gildea
"Enhancing Oral Health: Exploring the Impact of Polyphenolic Treatments on Dental Pellicle Formation and Erosion Protection"
Advisor: Peter Tandler, PhD, Associate Professor of Chemistry
Reader: Darlene Walro, PhD, Professor of Biology

The dental pellicle is a protective biofilm that forms on the tooth surface, serving as a barrier against damage. Polyphenolic treatments have been shown to strengthen the pellicle, enhance its protective properties, and provide additional defense for the tooth surface. However, the exact mechanisms by which polyphenols improve the pellicle's protective qualities remains unclear. To better understand this process, three polyphenols of varying sizes polyphenols (gallic acid, epicatechin gallate, and

tannic acid) were selected to be studied. A known side effect of polyphenolic treatments is tooth discoloration. In the first phase of the research, zirconia discs were pressed to mimic the surface of human teeth. The discs were then exposed to the three polyphenols and characterized before and after exposure. Visual characterization and UV-Vis spectroscopy revealed that Tannic acid caused noticeable staining of the zirconia discs. Furthermore, prolonged exposure to the polyphenols resulted in progressively more intense discoloration. In the second phase, the dental pellicle was recreated on the zirconia discs by exposing the discs to human saliva, allowing a natural pellicle layer to form. This pellicle was then characterized and exposed the specific polyphenols. Once exposed to the polyphenols, the pellicle was tested for its protective properties and erosion resistance. This research helps fill the gap in understanding how specific polyphenols interact with the dental pellicle on zirconia surfaces and highlights both their protective potential and the risk of discoloration.

Wednesday, March 26th
4:45 pm – 6:15 pm
Location: TNSC 108

Nathan Lanham
"The Impact of Self- Regulated vs. Regulated Study Breaks on Recall Using Short Time Intervals"
Thesis Advisor: Joseph Wayand, PhD, Associate Professor of Psychology
Reader: Davis Shelfer, PhD, Assistant Professor of Sociology

Studying is vital to maintain adequate grades throughout the schooling system, used to impress an interviewer, and even present findings to peers. Through this research, different forms of studying will be compared, following self-regulated study breaks or Pomodoro-regulated study breaks. Self-regulated breaks are when an individual takes a break whenever they choose whereas Pomodoro breaks are scheduled beforehand for a set period of time. It was hypothesized that individuals who implemented the Pomodoro method when applied to studying will retain more information compared to individuals who implemented a self-regulated break. It was also hypothesized that motivation would be greater in those participants within the Pomodoro group compared to the self-regulated group. Sex and academic year were explored when applied to the score on the questionnaire. The results of this experiment support the idea of future research exploring the time spent studying while implementing the Pomodoro method, as more time results in greater fatigue.

Madelynne Schweiger
"Physical Therapy Management of a Subject with Multiple Sclerosis and Secondary Cardiovascular Pulmonary Conditions: A Case Study"
Advisor: Alysha Walter, PT, DPT, CCS
Reader: Lauren Roskoph, PT, DPT, NCS, MSCS, Assistant Professor of Physical Therapy

Spasticity, swelling or stiffness in your muscles? Shortness of breath, dizziness or chest pain? These are a few of the common symptoms for individuals who suffer from chronic neurologic or cardiovascular pulmonary (CVP) diseases. Physical therapy (PT), is a discipline of healthcare where professionals provide resources including exercise rehabilitation, intervention, and patient education to various populations of patients, including those in need of neurologic or CVP training, to make improvements in their movement systems. Management methods from these two specialty areas of PT can be integrated together to offer a combined treatment approach. In the current literature there is a lack of research with a focus on combining specialty treatments. One neurologic disease that has extraneous research pertaining to its recommendations for PT management is multiple

sclerosis (MS), which causes the breakdown of the body's central nervous system (CNS). Conversely, there is a lack of research on the PT treatment for patients who have a comorbidity of MS and CVP diseases. Therefore, the purpose of this case study is to describe and analyze the PT management and outcomes for one subject who has both MS and various CVP conditions. This case study aims to expand upon the current research that exists for these populations of individuals and to increase the knowledge of the methods utilized in their PT management.

Meghan Bosley
"Ending Stigma in Adolescent Mental Health: Using Bibliotherapy and Other Teaching Strategies in a Ninth Grade English Linked Text Set"
Advisor: Michelle Lenarz, PhD, Professor of Education
Reader: Jennifer Green, PhD, Assistant Professor of Education

Most life-long mental health conditions develop during teenage years. Despite this and the research supporting it, few schools have a form of educating students about mental health and ways to recognize when they are struggling outside of a short discussion in a health class. This linked text set aims to help increase the number of students who understand mental health and the way it can impact people. The linked text set contains informational texts, novels, and visual texts which had been thoughtfully collected and give a well-rounded view of what it can look like to struggle with mental health. It also contains resources and learning strategies that can be used to educate students about mental health. There is also a letter to parents that has been created to inform them of what will be discussed in class. Also included are a series of resources that students can access if they feel that they may need help with their mental health. All this information has been compiled into a Google Site for easy access. The hope is that the creation and use of a linked text set such as this will encourage students to be more open to discussing mental health as well as increasing student self-awareness.