Ohio Wesleyan University

SPRING STUDENT SYMPOSIUM

APRIL 16, 2026
4:10-6:00 PM | MERRICK HALL

The Symposium provides an opportunity for students to share their work with the OWU Community and enter a dialogue that can spur ideas for new projects.

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THE SPRING STUDENT SYMPOSIUM

The Spring Student Symposium showcases the research and creative work of Ohio Wesleyan students across the academic spectrum.

The Symposium provides an opportunity for students to share their work with the OWU community and enter a dialogue that can spur ideas for new projects.

Undergraduate research, scholarship, and creative projects conducted and performed under the mentorship of expert faculty are central components of The OWU Connection. The annual Student Symposium shows the breadth, innovation, and quality of work produced by Ohio Wesleyan students.

THE OWU CONNECTION

THINK BIG. DO GOOD. GO GLOBAL. GET REAL.

BOARD 1A

KLEVIONE BROWN '28
RIVER HAMILTON '27

ANTERIOR CRUCIATE LIGAMENT AUTOGRAFT RECONSTRUCTION OUTCOMES IN ADOLESCENTS AND YOUNG ADULTS: A CRITICALLY APPRAISED TOPIC

Faculty Mentor: Professor Elizabeth Starns
Department of Health & Human Kinetics

Clinical Scenario
Anterior cruciate ligament (ACL) tears are one of the most common serious knee injuries seen in high school and college-aged athletes. 1. Many athletes opt for surgical reconstruction because ACL injuries often result in knee instability and impair their ability to return to play in their sport. 2. There are three primary types of autografts used in reconstruction: bone-patellar tendon-bone (BTB), hamstring tendon (HT), and quadriceps tendon (QT) autografts. 3. It is important to determine if a graft type has better return-to-play outcomes for adolescent and young adult athletes.

Results and Summary of Key Findings
A total of 19 articles were determined to fit the search criteria for this review. Most of the literature evaluated BTB or HT autograft types, whereas fewer systematic reviews included QT graft outcomes. Across studies comparing BTB and HT grafts, most found that both types had non-significant graft failure rates. Both graft types also yielded appropriate amounts of laxity in the knee joint post-surgery. Furthermore, at a one-year postoperative check-up, both types displayed good Quadriceps-to-Hamstring strength. While fewer studies have examined QT grafts, the evidence available suggests equally favorable outcomes.

BOARD 1B

KIEREN CAMPBELL '27
STEFANIIA MINAKOVA '28
SHANE SLACK '27
MARIEMA THIOUBOU '27

HOUSEHOLD WELL-BEING INSIDE THE UNITED STATES

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project examines the U.S. household sector using four key indicators: Real Retail and Food Service Sales, Personal Income and Disposable Personal Income, Personal Consumption Expenditures (PCE), and the Case-Shiller Home Price Index. Households are central to economic activity because they supply labor, earn income, and drive demand through consumption. The analysis incorporates historical context from the 2008 Recession and the COVID-19 pandemic to evaluate how household behavior responds to major economic shocks.
Data were collected from the U.S. Bureau of Economic Analysis, U.S. Census Bureau, and Federal Reserve Economic Data (FRED) and analyzed across three newsletters using graphs, tables, and short-term forecasts. Each variable was assigned to a team member to ensure consistent tracking over time. The purpose was to evaluate trends, compare forecasts to realized values, and assess whether economic theory aligns with observed data.

BOARD 2A

HAYDEN KELNER '27

MONITORING SPOTTED SALAMANDERS AND LEAF OUT PHENOLOGY AT STRATFORD ECOLOGICAL CENTER'S VERNAL POOL

Faculty Mentor: Professor Laurie Anderson
Department of Biological Sciences

Vernal pools are a key element of forests that hold groundwater and rainwater for a limited period of time. Many amphibians rely on vernal pools, specifically Ambystoma maculatum (Spotted salamanders), which are heavily dependent on these pools, along with precipitation and warming temperatures, for their spring breeding migration. One factor setting this study apart from others is the comparison of leaf-out phenology in conjunction with the spring breeding of Ambystoma maculatum. While many studies look at the salamanders breeding window, few also analyze leaf-out phenology. If the pool is shaded in early spring, the salamander eggs may receive less oxygen due to the symbiotic relationship the eggs have with a species of algae (Oophila amblystomatis). Organic matter from surrounding trees in the pool also impacts nutrient availability to the eggs and helps with their development. As global climate shifts, we hypothesize that these climates will cause a phenology shift in both plants and salamanders. We are currently observing the phenology of Quercus palustris, Fagus grandifolia, and Cephelanthus occidentalis along with the spring migration and breeding of Ambystoma maculatum at Stratford Ecological Center in Delaware, Ohio. Ongoing weekly observations for budbreak, expanded leaves, spermatophores, and salamander eggs are compared to observations of previous years following the guidelines of an ongoing collaborative study through Ecological Research as Education Network (EREN). Over the previous 4 years, we are yet to see a strong trend in plant phenology and temperature, with leaf-out occurring as early as April 4th and as late as April 21st. No strong trends in Ambystoma maculatum phenology have developed yet in our study, but when compared to other pools and other studies we may see similarities arise.

BOARD 2B

MCCALISTER KLINZING '28

REWILDING IN THE CENTRAL APENNINES: BRIDGING ECOLOGY, COMMUNITY, AND BUSINESS

Mentor: William Hayes
Chaplain's Office

Rewilding has emerged as an important conservation strategy aimed at restoring ecological processes and biodiversity through the recovery of keystone species and the protection of natural landscapes. In Italy's Central Apennines, conservation initiatives focus on protecting threatened species such as the Marsican brown bear and the Italian wolf while addressing the challenge of human-wildlife coexistence. This project explored the ecological, social, and economic dimensions of rewilding through collaboration with conservation organizations, including Rewilding Apennines and Salviamo l'Orso. During a 13-day field experience in Rome and the Abruzzo region, we met with leading conservation professionals, participated in wildlife monitoring and habitat restoration activities, and engaged with community-based conservation initiatives. These experiences provided insight into how rewilding projects operate in practice and how conservation organizations balance ecological restoration with local economic and social considerations. In particular, the project examined the role of funding strategies, ecotourism, and community partnerships in supporting long-term conservation success. The experience deepened our understanding of conservation management and human–wildlife coexistence while highlighting the interdisciplinary relationship between ecological science, community engagement, and economic sustainability in modern conservation efforts.

BOARD 3A

ELLA HOLTSBERRY '27
CASEY KAYLOR '27
ETHAN PAYNE '28
SIMON RIVERA '28

BUSINESS IV VARIABLES

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

Our research focused on tracking economic four variables (Producer Price Index (PPI), the Chicago Purchasing Managers Index (PMI), ADP Private Employment, and the Baker Hughes Crude Oil Rig Count) throughout the semester. Throughout our research we watched these four variables act as measures of industrial health and consumer demand in the economy. Our analysis found that the Chicago PMI is a leading indicator in GDP shifts, while changes in the Baker Hughes Rig Count provided context for the energy sector and inflationary trends seen in the PPI. ADP Private Employment data provided real-time insight into the labor market. After reflecting on our different data points we have come to the conclusion that each of these variables on their own give a narrow view of the economy's health but when we synthesized the variables it offers a well-rounded narrative of possible economic expansion or contraction.

BOARD 3B

SHELBY BAY '26
MADDIE HOYT '26
MARIA THIBODEAUX '27

THE EFFECTIVENESS OF AN EDUCATIONAL PROGRAM ON YOUNG SWIMMERS WATER CONSUMPTION AND DRY LAND EXERCISES

Faculty Mentor: Professor Elizabeth Starns
Department of Health & Human Kinetics

Young swimmers are reluctant to participate in dry land exercise, and they are more likely to become dehydrated than their non-swimming counterparts. Therefore, this study aimed to evaluate the impact of a four-week educational program on strength-training exercises and water consumption. This study utilized a single-arm pre/post intervention design. Thirty-seven swimmers (mean age 14.08 ± 2.00 years) from two local summer swim clubs completed previously validated and reliable surveys on exercise and hydration before and after participating in the intervention entitled the Whole Athlete Program. The Whole Athlete Program was a 1 hour per week, 4-week educational program designed to teach young swimmers the importance of strength training, nutrition, and mental aspects of sport. Paired samples t-tests were used to assess the difference between pre- and post-intervention survey results on dry land exercise and water consumption. The participants showed a significant increase in the minutes spent per week completing bodyweight exercises from the beginning of the program (M = 1.92, SD = 1.52) to the end of the program (M = 2.77, SD = 2.04)(t 35 = -2.20, P< .05), as well as exercises with resistance bands from the beginning of the program (M = 1.63, SD = 1.66) to the end of the program (M = 2.37, SD = 1.93) (t 35 = -2.39, P< .05). The subjects also increased the number of water bottles consumed per day from the beginning of the program (M = 3.44, SD = 1.41 bottles) to the end of the program (M = 3.95, SD = 1.58) (t 31 = -2.41, P< .05). Young swimmers can benefit from a simple and short educational program to supplement what is learned in practice. Education on the importance of dry land exercises and hydration can have positive impacts.

BOARD 4A

LILLY COLBECK '27
EMERSON FREAS '26
FRIDA RAMIREZ '27

THE GOLDEN AGE IN THE MODERN DAY: ADAPTING ANA CARO'S VALOR, AGRAVIO Y MUJER

Faculty Mentor: Professor Glenda Nieto
Department of World Languages & Cultures

This presentation will focus on the work completed by our team over the last semester in an internship under Professor Nieto's guidance, which focused on adapting a Golden Age Spanish play into a short-form theatrical text. We studied Valor, agravio y mujer (The Courage to Right a Woman's Wrongs), written by Spanish playwright Ana Caro in the 17th century. In collaboration with Cuban theatre director and playwright Leyma López (Repertorio Español), with additional support from the international research group SigloLatinx, we adapted the original play to create a work reflective of the societal themes of patriarchy, feminism, and justice that are present in the original and continue to be relevant in the modern age. Caro's play was produced during the Spanish Golden Age (1492-1681), a period in which Spain's politics, art, music, and literature reached new heights and left a lasting impact on global society.

We will explain the process and outcomes of our project via a poster presentation. Specifically, we will discuss what we learned about adapting 17th century Hispanic theatrical works for modern audiences. We will also share the outcomes of our trip to New York City, where we participated in writing and acting workshops with Leyma Lopez and Cuban actress Zulema Clares, attended various shows produced and performed by Latine artists, and visited cultural heritage museums. Our poster intends to show how these experiences allowed us to better interpret and understand the themes within each show, as well as analyze how multiple theatrical elements such as music, dance, lighting, sound design, and blocking work together to convey such themes. Finally, we aim to demonstrate how this internship helped us gain a stronger sense of how our own artistic and intellectual work might look, feel, and sound, and how these choices will impact the message of our story.

BOARD 4B

JADEN HOPKINS '27
RYAN MCGINLEY '27
ELI STEWART '27
ALEX STOLLER '27
NANA TWENEBOA-KODUA '27

THE RECALIBRATION DEEP DIVE: A QUANTITATIVE STUDY OF LABOR HOARDING AND WAGE STICKINESS IN 2026

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project analyzes changes in the U.S. labor market during the first quarter of 2026 by examining how employment trends shifted from labor hoarding toward a more balanced and market-driven adjustment. Using three sequential newsletters as a framework, the project evaluates key labor market indicators and how they responded to major economic disruptions, including a 41-day nursing strike and severe winter weather. The analysis focuses on five main economic variables: Non-Farm Payrolls, Average Hourly Earnings, the Unemployment Rate, JOLTS, and Initial Jobless Claims, in order to assess how leading, lagging, and coincident indicators behave during periods of economic uncertainty.

The project also reviews our team's forecasting approach, particularly the unexpected February payroll decline and the March rebound of +178,000 jobs, which served as a reality check for our predictions. Sticky Wage Theory is used to explain why wages remained relatively stable, reaching $37.38 with a slower annual growth rate of 3.5% even as hiring demand cooled. In addition, the project discusses the limitations of traditional labor market data, such as frequent revisions and the exclusion of benefits in wage measurements. Finally, the analysis considers the implications for Federal Reserve policy, suggesting that continued labor market resilience may support a higher-for-longer interest rate approach aimed at achieving a soft landing without increasing inflation. Overall, the project concludes that the labor market is adjusting and stabilizing rather than entering a period of decline.

BOARD 5A

JENNIFER VELASQUEZ '27

ANTIMICROBIAL PROPERTIES OF RED OAK AND WHITE OAK ORGANIC EXTRACTS

Faculty Mentor: Professor Andrea Suria
Department of Biological Sciences

The rise in antimicrobial resistance is a global issue, requiring the discovery of new antimicrobials. Recent studies have begun to revisit native plants as potential sources of new antimicrobials for drug discovery. In this study, we collected the bark of four red oaks, Quercus rubra, and four white oaks, Quercus alba. Samples were frozen using liquid nitrogen, ground with a mortar and pestle, and extracted using 95% ethanol for 48 hours. Organic extracts were dried using a rotary evaporator and then resuspended in DMSO for zone of inhibition testing. Extracts were tested against six relatives of the ESKAPE pathogens, which are some of the major threats to healthcare due to high rates of antibiotic resistance: Enterococcus raffinosus, Staphylococcus epidermidis, Escherichia coli, Acinetobacter baylyi, Pseudomonas putida, and Enterobacter aerogenes. During initial testing with 1 mg/mL of extract, only one red oak sample inhibited growth of three bacteria: P. putida, E. raffinosus, and A. baylyi (average ZOI 1.45 cm). During the second round, more highly concentrated extracts were tested (average 93±77.6 mg/ml) against these three bacteria. We found that there was activity in three red oak samples and one white oak sample against E. raffinosus (average ZOI 1.09cm). Three red oak and two white oak samples inhibited A. baylyi. Finally, two red oak samples inhibited P. putida. Future research will need to screen additional bark samples, collected from different times of the year, to further explore the antimicrobial activity. These findings can further our understanding of antimicrobial activity in native plants that have been used traditionally by indigenous communities and may help fight resistant bacteria.

BOARD 5B

ELLA NEUENSCHWANDER '27

HOW DIET AND ENERGETICS DRIVE FINE-SCALE DEMOGRAPHIC VARIATION IN THE EASTERN RED-BACKED SALAMANDER (PLETHODON CINEREUS)

Faculty Mentor: Professor Eric Gangloff
Department of Biological Sciences

Life-history traits, including growth rates, timing of maturity, and reproductive output, are closely tied to fitness and, by extension, population dynamics. Identifying sources of variation in life-history traits is therefore crucial for explaining how and where species can become established or persist. For example, the external environment influences life-history trajectories through factors determining energy intake, such as prey availability and activity times. As an exemplar model species, Plethodon cinereus (Eastern Red-Backed Salamander) exhibits life history variation across its broad geographic range, but also at a fine scale. Here, I present a study testing how diet composition and energetics may drive life-history diversity found in replicate Ohio salamander populations in mature and successional forests, which differ in canopy cover and temperature profiles due to historic differences in land use. At sites where we have capture-mark-recapture and morphological data spanning nearly a decade, we collected stomach contents of both adult males and females through gastric lavage. This technique provides high-quality DNA samples, with which we used a metabarcoding approach to quantify the prey taxa consumed. Further, we will measure energy content of the consumed food directly via bomb calorimetry. We predict that prey diversity and available prey energy will be higher in the stomach contents of successional forest salamanders, which exhibit faster growth rates and reduced time to sexual maturity. This will support the hypothesis that diet and energetics are drivers of life-history and demographic variation at a fine geographic scale. We can leverage these data to understand how Plethodon cinereus responds to historical and contemporary land use, which provides a foundation for understanding the responses of other species, including many at-risk amphibians.

BOARD 6A

JUSTIN BEEKMAN '27
YA'VA HARRIS '27
JACK NOVAK '27
MILES THEETGE '27

INFLATION

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project analyzes inflation trends in the United States economy through a series of three newsletters that focus on key economic indicators, including the Consumer Price Index, Personal Consumption Expenditures, Producer Price Index, and Michigan Inflation Expectations. The newsletters track changes in inflation over time, compare forecasts to actual outcomes, and evaluate how each variable contributes to understanding overall economic conditions. The purpose of the analysis is to determine whether inflation is steadily declining or remaining persistent despite policy efforts.

The findings suggest that inflation has generally slowed compared to earlier periods but remains somewhat elevated and uneven across different indicators. Measures such as CPI and PCE show gradual improvement and movement closer to long-run targets, while PPI reveals continued cost pressures at the production level driven by factors such as energy prices and global events. In addition, consumer expectations remain relatively high, indicating that individuals still anticipate rising prices, which can influence spending behavior and wage demands.

Overall, the newsletters demonstrate that while economic theory predicts inflation should decrease with tighter monetary policy, real-world factors such as supply shocks and delayed policy effects can slow this process. The analysis suggests that interest rates will likely remain elevated as policymakers attempt to fully stabilize inflation. This project highlights the importance of analyzing multiple variables together to form a more complete and accurate understanding of inflation trends and future economic conditions.

BOARD 6B

SHARVI ARORA '26
EMILY HOLT '27
JAN KUBACEK '26

INVESTIGATING THE EFFECTS OF EARLY ADOLESCENT STRESS ON GABAA A3 SUBUNIT EXPRESSION IN THE MEDIAL PREFRONTAL CORTEX OF ADULT MICE

Faculty Mentor: Professor Chelsie Vadnie
Department of Psychology

Psychiatric disorders frequently emerge in late adolescence or early adulthood. Although stress is an established risk factor, the neurobiological mechanisms by which stress during adolescence could lead to the development of psychiatric disorders are unclear. Short periods of physical stress during adolescence in rats has been shown to have long-lasting effects on behavior. Since more numerous tools are available for mouse basic research, we wanted to determine if similar physical stress during adolescence in mice increases psychiatric-related behaviors. We found that just three days of stressors during early adolescence (postnatal day (PND) 25 to PND 27) increased anxiety-like behavior in adult mice in the open field. Using the brain tissue from these mice, we investigated if adolescent stress affects the expression of GABAA α3, GABAA α2, and GABAA γ2 receptor subunits in the medial prefrontal cortex (mPFC) and ventral hippocampus since these genes and brains regions have been implicated in the effects of adolescent stress and/or benzodiazepines. Interestingly, three days of adolescent stress decreased GABAA α3 receptor subunit expression in mPFC. To determine if a longer period of adolescent stress may have more robust effects, mice were exposed to six days of stress from PND 25 to PND 30. Adolescent stress increased anxiety-like behavior in adult mice in multiple behavior assays. Brain tissue was then collected ~48 hours after the last behavior test. The brains were preserved with paraformaldehyde, cryoprotected, and sectioned using a cryostat. We are now investigating if six days of adolescent stress affects the protein levels of GABAA α3 receptor subunit in mPFC using free-floating immunohistochemistry (IHC). Progress on the IHC experiment will be discussed. Ultimately, we hope that our work will help establish a powerful mouse model to investigate the effects of adolescent stress on adult behavior and neurobiology.

BOARD 7A

DOYI KIM '27
SOPHIA ROHR '27
IAN SANDER '27

SECRETS OF THE SAILFIN: IMPACT OF SOCIAL ENVIRONMENT ON GUT MICROBIOME OF SAILFIN MOLLIES (POECILLA LATIPINNA)

Faculty Mentor: Professor Andrea Suria
Department of Biological Sciences

The gut microbiome plays a key role in host health, behavior, and stress resilience. In the human gut microbiome, messages are conveyed from the intestines to the central nervous system through the vagus nerve, an association known as the gut-brain axis. In fish, an analogous gut-brain interaction has shown that environmental changes impact the gut microbiome composition and population health. However, little is known about how social structures affect microbiome composition and diversity. Here, we use the social dynamics of the sailfin molly, Poecilia latipinna, as a model to examine the effect of social interactions on the gut microbiome. Courting males establish hierarchies with the largest dorsal fins dominating. Males are often aggressive toward each other and oppressive or persistent with females, exhibiting courtship displays from courting males or "sneak and thrust" behaviors from small males. Female sailfin mollies were housed under controlled conditions with and without male conspecifics to isolate the impact of specific social behaviors. Fecal samples were collected, bacterial DNA was purified, and 16S rRNA genes were sequenced. Alpha and beta diversity analyses identified 3,793 unique amplicon sequence variants. Shannon diversity analysis revealed non-courting males exhibited a distinct diversity profile, differing significantly from both females ($p = 0.000239$) and courting males ($p = 0.000932$). Bray-Curtis dissimilarity revealed that gut microbiome composition differed by social condition: females housed with males exhibited shifts in microbial community structure relative to females housed without males, suggesting social interaction-mediated microbial restructuring. These findings highlight social behavior as an important and underexplored driver of microbial community dynamics.

BOARD 7B

LUKE JOHNSON '27

BEYOND THE EYE TEST: A DATA-DRIVEN FRAMEWORK FOR QUANTIFYING "HOT" AND "COLD"

Faculty Mentor: Professor Scott Linder
Department of Mathematics & Computer Science

Determining whether a Major League Baseball hitter is hot or cold has traditionally relied on simple counting statistics and the subjective "eye test." These approaches fail to capture whether performance changes are meaningful or pitch-specific. This project introduces a data-driven framework to objectively quantify hitter hot and cold streaks using MLB Statcast data.

Standard pitch classifications (e.g., four-seam fastball, slider) are pitcher-defined labels, they do not reflect how a hitter perceives pitch movement. A 94 mph four-seamer from one pitcher may move similar to a 90 mph sinker from another as perceived by the batter. To address this, we apply HDBSCAN (Hierarchical Density-Based Spatial Clustering of Applications with Noise) to group all pitches seen by a batter using three batter-centric features: horizontal movement (pfx_x), vertical movement (pfx_z), and spin axis. This produces perceptual pitch families per hitter, independent of traditional labels.

We then calculate expected batting average (xBA) within each cluster and compare a user-specified date range against the hitter's personal baseline. If cluster-level xBA is stable over time, the clusters represent meaningful pitch families from the hitter's perspective, and deviations from baseline become a reliable signal of hot or cold performance. Results are visualized as four-quadrant strike zone heatmaps, allowing coaches, and analysts to immediately see which pitch movement profiles a hitter is struggling or succeeding against.
A case study on Vladimir Guerrero Jr. demonstrates interpretable, actionable output. This approach bridges advanced pitch tracking technology with hitter performance analysis, offering a more objective and granular alternative to traditional streak detection.

BOARD 8A

DEVON HALEY '26

HOMEFIELD ADVANTAGE IN ACTION: CLIMBING AND SPRINTING PERFORMANCE IN PODARCIS MURALIS

Faculty Mentor: Professor Eric Gangloff
Department of Biological Sciences

How organisms adjust their traits to different environments is a central question in biology, particularly relevant in the context of introduced species where rapid phenotypic shifts can influence ecological impact and spread. Common wall lizards (Podarcis muralis) are urban specialists native to Europe but invasive in North America. In Cincinnati, Ohio, USA, these lizards are found in both urban and forested habitats, raising the question of how they may thrive in either habitat and impact native wildlife. Here, we test the 'homefield advantage' hypothesis – that organismal traits match the environments in which they live. We predicted that lizards sprint and climb faster on substrates and at temperatures that match their home environment. To test our predictions, we measured sprinting and climbing speeds at five temperatures (spanning the range of active temperatures) on bark and stone tracks in animals from both wall habitats (N = 18) and forest habitats (N = 20). Our findings may have important implications for understanding how phenotypes are matched to the environment in which organisms live, which is important to further understanding their spread around southern Ohio and beyond.

BOARD 8B

ALEX BZDAFKA '27

EFFECTS OF SOIL SODIUM CONCENTRATION ON NECTAR SODIUM CONCENTRATIONS OF SNAPDRAGONS

Faculty Mentor: Professor Laurie Anderson
Department of Biological Sciences

Sodium is often a limiting micronutrient for animals, which is important for osmoregulation and balancing electrochemical gradients within cells. If animals are salt deprived it can lead to birth defects, seizures, and death. Herbivores are often limited by sodium as plants do not have much within their tissues, however as humans irrigate cropland and apply deicing salts to roads, elevated levels of sodium are introduced into soils. High soil sodium have been shown to increase sodium concentration in plant tissue, as well as floral nectar. Elevated levels of nectar sodium concentrations has been shown to increase attractiveness to pollinator species. The mechanisms behind uptake of sodium into nectar is not well understood, therefore we aim to characterize whether plants are able to physiologically regulate the amount of sodium that enters nectar. To investigate this we used snapdragons as a model species and subjected them to two different levels of salt after they bloomed, and 24 hours after exposure nectar samples were collected. We then assessed the nectar yield, sugar content, and sodium concentration of the nectar in comparison to controls. We hypothesize that nectar sodium concentrations will be dependent on soil concentrations and that there will be either no or only limited ability to regulate nectar sodium concentrations.

BOARD 9A

WADE BECKSTROM '27
JASON MOSHER '27
HENRY ROSS '27

HOUSING NEWSLETTER

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

The project analyzes trends in the housing market by using indicators such as the Case-Shiller Home Price Index, Existing Home Sales, and New Home Sales. The purpose of the project was to better understand how housing prices and sales activity have fluctuated over time. To show what we found, , we researched data and created a newsletter summarizing our analysis. Our research focused on housing market patterns from the early 2000s to the present, with particular attention to the housing market crisis of 2007–2008. We examined how home prices rose before the crisis, and then declined sharply during the recession, and recovered in the following years. Through this project, we learned that the housing market is highly sensitive to economic shifts and can experience significant changes over time. Overall, the findings highlight the importance of monitoring housing indicators to better understand economic trends.

BOARD 9B

AIDAN WEIR '27

HISTOLOGY OF FISH REPRODUCTIVE ORGANS

Faculty Mentor: Professor Tami Panhuis
Department of Biological Sciences

This study examined two fish species: Gambusia and Heterandria formosa. We looked at the testis for Gambusia and the ovaries for Heterandria formosa. We compared groups that were exposed to BPA in water and the control group, which was not exposed to BPA. The samples were collected at the Gabor lab at Texas State University. These samples were processed and embedded in paraffin. Tissues were sectioned and slides were stained. Histological slides were examined for the effects of BPA.

BOARD 10A

RYAN BETTS '26
CARSON BROWNING '27
EVALEIGH GARNETT '26
JACK JENNINGS '27

EVALUATING THE ECONOMIC INSIGHT INTO THE IMPACTS OF THE FINANCIAL SECTOR

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This finance newsletter project was created to deliver clear, relevant, and timely financial information to readers in a concise and engaging format. The newsletter is designed to simplify complex financial topics such as market trends, economic news, and business developments so that a broad audience can better understand and apply them. The project emphasizes accuracy, readability, and practical value by combining current financial events with straightforward analysis and insight. Overall, the purpose of the newsletter is to inform readers, strengthen financial literacy, and provide useful content that helps them make more confident financial decisions.

BOARD 10B

OLIVIA GREEN '27
DANIEL KOOMSON '27
JADA TAYLOR '28
AARON WOODS '27

ECONOMIC INDICATORS BUSINESS IV

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This is a Team Data Project on National Income and Business Cycles for Econ 259. We analyze specific macroeconomic sectors through a series of three newsletters. The primary objective is to track, analyze, and forecast key economic indicators to create a comprehensive, consistent narrative of current business conditions. Our team monitors the Wholesale Trade Sales and Inventories, ADP Private Employment, the Chicago Business Barometer (PMI), and the Baker Hughes Crude Oil Rig Count. The project is designed to track measurement mechanisms, historical trends, and data release schedules for each variable. Throughout the semester, we assess whether these variables serve as leading or lagging indicators around economic recessions and identify their limitations in explaining the assigned sector. The project also includes forecasting upcoming economic data. By comparing our projected values with actual released data, we evaluate our forecasting accuracy and explore the causes of any discrepancies. Current analysis shows a steady but cautious and slowing U.S. economy based on our variables. Regional indicators like the Chicago PMI have shown short-term growth driven by new orders and hiring. This is contrasted with persistent inflationary pressures observed in the PPI and slow private-sector job growth. Additionally, subdued energy investments, reflected by rig counts remaining well below historical averages, may suggest limited long-term expansion. Ultimately, this project links empirical data with macroeconomic theory to understand the broader implications for U.S. monetary policy.

BOARD 1A

RILEY BROKAW '26
REID HALL '28
CORD PODOLAN '26
TYLER STATEN '27

INFLATION: COMPARING EXPECTATIONS AND REALITY

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

Inflation affects everyone through the prices we see day to day, be it on the road, looking at gas prices, or in a store buying groceries. This group project compares the key ways inflation is measured, being the Consumer Price Index (CPI), Producer Price Index (PPI), Personal Consumption Expenditures (PCE), and Cleveland Fed Inflation Expectations, and seeks to share how this has and will affect people. Each measure teaches us something a little different than the others, but all are important in understanding inflation. Our approach demonstrates the importance of the various measures of inflation and demonstrates how these indicators, alongside the inflation expectations, can shape policy and national decisions.

BOARD 1B

BROOKLYN UPP '27

ACTIVITY-COOCCURRENCE OF RED BACKED SALAMANDERS

Faculty Mentor: Professor Eric Gangloff
Department of Biological Sciences

Plethodon cinereus (Eastern Red-backed Salamander) is emerging as a model study organism for understanding anthropogenic effects on forest ecosystems, increasing in relevance with ongoing changes in climate. This species has a broad geographic range in the northeastern US and southeastern Canada, where it can be found in a great diversity of climates and habitat types. Quantifying differences among populations across these environmental gradients can provide insights into potential responses to future environments. We conducted five years of capture-mark-recapture studies on surface-active salamanders at two nature preserves in Central Ohio. This included surveys in both the spring and fall using replicate coverboard arrays (N = 6) at sites varying in historical land use, slope aspect, and forest composition. Our study examined how environmental drivers (air and soil temperature, humidity, and soil-water content) as well as intrinsic factors (size, sex, and morphology) affect the surface activity of Eastern Red-Backed Salamanders. Importantly, we quantified social interactions using co-occurrence between individuals and used spatial capture-recapture models to estimate individual home range size and movement. Surface activity in salamanders peaked at intermediate air temperatures and with higher air humidity. Surprisingly, adult salamander pairings were seen more between females and males than same-sex pairings. Juvenile salamanders were more likely to be found with adult females than adult males. In addition, we will present data on home-range size, individual movement patterns, and how these vary across sites. The data collected from our study not only describes factors affecting the social and activity patterns of these model organisms, but expands and broadens our understanding of amphibian responses to global change.

BOARD 2A

MIA BUCCI '28
LILLY COLBECK '27
PEYTON GROVES '26
MARIA THIBODEAUX '27

ACQUISITION OF FOOD IN CUBA

Faculty Mentor: Professor Elizabeth Nix
Department of Health & Human Kinetics

Since the Cuban Revolution of 1959, a rationing system has been accessible to citizens through the socialist Cuban government. Historically, rations have been plentiful and provided Cubans with the necessary food items. However, in recent decades, the ration system has been insufficient, forcing Cubans to acquire food through alternative means, including the black market. In March of 2026, our team traveled to Cuba to observe the state of food acquisition through trips to local farms, private restaurants, government ration stations, and black market vendors. We documented our observations through photography, audio recordings, and written descriptions and reflections. We directly participated in the food system through agricultural labor, purchasing goods on the black market, and preparing meals in an authentic Cuban setting. In order to obtain enough food and ingredients for a balanced meal, we had to visit over six black market vendors, in addition to other staples provided by our guide beforehand. Doing this we spent multiple months' salary on one meal, which is on average ten USD, or five-thousand Cuban Pesos. This activity put into perspective how inadequate a month's salary is to feed a family, along with provided government ratios. Our research affirmed that government rations do not provide sufficient nutrition to Cubans. Acquiring additional food is an arduous but necessary process that Cubans must engage in regularly. This occurs through the black market as well as the development of small-scale organic farming practices in both rural and urban communities. Growing economic limitations due to U.S. intervention in Venezuela and international embargos will most likely increase the difficulty of food acquisition in the coming months. Nonetheless, these difficulties encourage great resilience and innovation among the Cuban people.

BOARD 2B

JACQUELINE HARPER '28
MALLORIE HOLLIS '26
KAILEY SWEET '28

UNDERSTANDING AND FORECASTING THE LABOR MARKET

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project provides a comprehensive analysis of key labor market indicators to better understand recent economic trends and their implications. Focusing on three primary variables: initial jobless claims, unemployment, and employment, the newsletters evaluate their historical significance, how they are constructed, and their effectiveness in signaling changes in labor market conditions. Each variable is examined in detail, including how it is measured, its role within broader economic analysis, and its behavior over recent months.

By comparing these indicators, the project highlights their distinct yet complementary roles in assessing labor market health. Initial jobless claims serve as a leading indicator, offering early signals of labor market shifts, while unemployment and employment levels provide a lagging indication of overall economic conditions. Recent movements in these variables are analyzed to identify emerging patterns and potential turning points in the economy.

The findings suggest that, while some indicators point to continued labor market stability, others reveal signs of fluctuation that highlight the complexity of current economic patterns. Together, these variables showcase how the labor market is cooling.

BOARD 3A

CARSYN HAGANS '26

GROWING SEASON TEMPERATURE AND TREE SIZE INFLUENCE SAP SUGAR CONCENTRATION IN ACER SACCHARUM: A MULTI-YEAR STUDY

Faculty Mentor: Professor Laurie Anderson
Department of Biological Sciences

Sugar maple (Acer saccharum) sap sweetness is important for determining maple syrup yield and its economic value. Sap sugar concentration reflects nonstructural carbohydrate (NSC) reserves accumulated during the previous year and mobilized during spring freeze-thaw cycles. Because carbohydrate storage is sensitive to growing season temperature and length, climate change has the potential to alter sap sweetness and syrup production. However, the drivers of interannual variation of sap are not well understood. From 2019 to 2025, the sap sugar concentration (°Brix) and tree diameter were measured for 55 trees within an annually tapped sugar maple stand in central Ohio, USA. We evaluated whether sap sugar content was related to tree diameter and to the mean temperature of the previous growing season. Preliminary correlation analyses show that larger diameter trees have sweeter sap on average (correlation coefficient = 0.029, P = 0.03) and suggest that sap tends to have a lower sugar content following growing seasons with higher mean temperatures, although this relationship is not statistically significant (correlation coefficient = -0.64, P = 0.17). Continued data collection in the spring of 2026 will extend this long-term dataset, with additional measurements planned in the coming years. These results suggest the potential for climate change to reduce sap sweetness and syrup yield, although more data are needed to be confident of this trend.

BOARD 3B

MADDIE HOYT '26

THE EFFECT OF TAPER ON SCAPULAR POSITIONING IN DIVISION III COLLEGIATE SWIMMERS

Faculty Mentors: Professor Andrew Busch
& Professor Elizabeth Starns
Department of Health & Human Kinetics

Tapering has been shown to improve swimming performance, but its effect on scapular positioning is less clear. This study compared differences in scapular positioning during the competition season with the tapered season pre- and post-practices in eighteen varsity collegiate swimmers using the Neutral Positioning Test (NPT), Lateral Scapular Slide Test (LSST) at 45° and 90°, and an Active Range of Motion (AROM) test. Distances were measured in centimeters between the inferior angle of the scapula to the vertebral spinous processes located on the same horizontal plane for the NPT, LSST at 45° and 90°, and the AROM test, and from the superior angle for the NPT. Paired-samples t-tests revealed significant differences between non-taper (NT) and taper (T) in the NPT (inferior) pre-practice of the right scapula, and the left scapula LSST at 45° post-practice and 90° pre-practice. For AROM tests, significant differences were found in the left scapula pre-practice and post-practice, and right scapula pre-practice and post-practice. In the tapered season, significance differences were found between pre- and post- tests during the AROM test on the right scapula and during the NPT (inferior) on the left scapula. No significant differences were found comparing pre- and post- scapular positioning during the competition season, or in swimmers who reported pain or previous injury before the season. All AROM tests revealed greater lateral translation of the scapula during the tapered season. Comparing the non-tapered season to the taper season, significantly less lateral translation was noted pre-practice in the right NPT (inferior) and left LSST 90°, and post-practice in the left LSST 45°. Clinicians must interpret these findings with caution however, because even though all scapular assessments demonstrated high reliability, the amount of change noted did not exceed the MDC necessary for clinical relevance.

BOARD 4A

COOPER CHRISTIE '26

EXAMINING THE FUNCTION OF A POTENTIAL TYPE VI SECRETION SYSTEM TOXIN IN A REPRODUCTIVE BACTERIAL SYMBIONT OF THE HAWAIIAN BOBTAIL SQUID

Faculty Mentor: Professor Andrea Suria
Department of Biological Sciences

The type VI secretion system (T6SS) is a contact-dependent effector delivery system found in many Gram-negative bacteria, which functions via the mechanical puncturing of neighboring cells. The T6SS is known to be utilized in interbacterial competition and eukaryotic cell damage. Genomes of several symbiotic bacteria isolated from the accessory nidamental gland (ANG) of Euprymna scolopes have been found to possess a T6SS, which may contribute to competition within the organ, or to their symbiotic role in protecting the squid eggs from biofouling. Leisingera sp. ANG-M7 in particular was found to contain a second T6SS cluster, and has been shown to kill Leisingera sp. ANG-DT in vitro despite containing only eight of the 13 core structural genes typical to a T6SS. Cluster 2 of ANG-M7 contains only one potential toxin-antitoxin pair, identifiable by the presence of three conserved PAAR motifs, which does not resemble any effector of cluster 1. To confirm the functionality of these genes, we sought to create disruption mutants of both via homologous recombination. Regions within the suspected toxin and antitoxin genes, as well as a region spanning both, were amplified with PCR and assembled into a plasmid vector. These disruption plasmids were transformed into DH5α E. coli for cloning, then transformed into the mobilizer E. coli strain RHO3 for conjugation with ANG-M7. The resulting mutants will be screened for loss of T6SS-dependent killing by contact-dependent coculture with ANG-DT. We expect to see loss of T6SS-mediated killing in ANG-M7 mutants where the toxin gene and the pair of genes were disrupted. Disruption of the antitoxin gene may result in self-killing when grown in co-culture with WT ANG-M7. This would validate the role of these genes as a toxin-antitoxin pair, confirm the identity of the toxin, and inform our understanding of this unique T6SS cluster.

BOARD 4B

BRADLEY CONLEY '28
EVAN DUNHAM '26
CHINEDU MELENU '26
GARRETT OSBORNE '28

BUSINESS III DATA NEWSLETTER

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project looks at several key economic indicators to understand the current state of the U.S. economy and where it may be headed in the short term. Across two newsletters, we focus on four main variables: the Chicago Fed National Activity Index (CFNAI), gasoline prices, U.S. crude oil production, and the Redbook Index. Each of these helps explain a different part of the economy, from overall growth to consumer behavior and energy markets.

The CFNAI provides a broad snapshot of economic activity by combining many different indicators into one value. Recent data suggests the economy is growing slightly above its normal trend, with strong performance in production and income. However, weaker results in areas like sales and orders show that not all parts of the economy are keeping up at the same pace.

Gasoline prices are used to track changes in the cost of living and are influenced by both supply and demand. While higher demand can signal a strong economy, prices can also rise due to external factors like global conflicts. U.S. crude oil production remains at high levels, which helps keep energy supply stable and supports the overall economy. Meanwhile, the Redbook Index shows that consumer spending is still increasing, but at a slower and more cautious rate.

Overall, the indicators suggest that the economy is stable and continuing to grow, largely driven by strong production. However, some mixed signals and outside factors create uncertainty about future trends, making it important to look at multiple variables together for a clearer picture. These indicators are incredibly important especially right now with on the ongoing war in Iran.

BOARD 5A

AUSTIN JACKSON '26

STOCK FORECASTING: INTEGRATING MODELS FOR STOCK PREDICTION

Faculty Mentor: Professor Craig Jackson
Department of Mathematics & Computer Science

This project presents a data-driven stock forecasting dashboard designed to compare and evaluate multiple predictive modeling techniques across varying time horizons. With increasing interest in quantitative finance and algorithmic forecasting, the ability to assess different modeling approaches within a unified framework is critical for both researchers and practitioners.

The system integrates financial data retrieved through the Yahoo Finance API and stores processed datasets in a structured SQL database for efficient querying and reuse. Three forecasting methodologies were implemented: Autoregressive Integrated Moving Average (ARIMA) for traditional time series analysis, Random Forest for machine learning-based regression, and Prophet for decomposable time series forecasting. Each model generates predictions for stock closing prices across four distinct horizons: one day, one week, one month, and one year.

The backend was developed using Python, leveraging libraries such as pandas, scikit-learn, statsmodels, and Prophet for data processing and model implementation. A Streamlit-based front end provides an interactive dashboard that enables users to select stocks, visualize historical data, and compare model predictions in real time.

BOARD 5B

ANDREW INAMDAR '27

CHARACTERIZING THE MICROBIOME AND ANTIMICROBIAL ACTIVITY OF MUD CRAB AND PORCELAIN CRAB EGGS

Faculty Mentor: Professor Andrea Suria
Department of Biological Sciences

Defensive symbiosis is a mutualistic interaction where a symbiotic partner provides protection to its host organism from predation or infection by fungal, viral, or bacterial pathogens. Multiple instances of defensive symbiosis have been described where symbiotic bacteria produce secondary metabolites that prevent biofouling of developing eggs. These studies found that bacteria isolated from squid, lobster, and shrimp eggs have antimicrobial activity to protect the eggs from fungal infections, however this activity has yet to be described in crabs. We investigated the microbial community isolated from the eggs of two species of crab collected from Beaufort, North Carolina, the mud crab, Eurypanopeus depressus, and porcelain crab, Petrolisthes armatus. Microbiome analysis revealed that the Alphaproteobacteria, Bacteroidia, and Gammaproteobacteria were the most abundant groups present in the microbial community of these crab eggs. No significant differences were found between the microbial communities of the two crab species' eggs. Additionally, 61 bacteria from E. depressus and 42 bacteria from P. armatus were isolated on seawater tryptone media. In total, 95 egg isolates were tested for antimicrobial activity against the marine bacteria, Roseovarius sp. TM1035 and Vibrio fischeri ES114, using a zone of inhibition assay. We found that 26 isolates inhibited TM1035, 6 isolates inhibited ES114, and 2 isolates inhibited both target strains. These findings suggest that crabs may also have defensive microbial symbioses similar to those found in other marine invertebrates and lays the foundation for future explorations into the function of these egg communities.

BOARD 6A

LAUREN DORSEL '26
CAMILLE PAYNE '26

UNDERSTANDING THE CHALLENGES OF DISABILITY AND REPRESENTATION: THE CASE OF FOOD ALLERGY

Faculty Mentor: Professor Franchesca Nestor
Department of Politics & Government

Previous literature suggests that there are unique challenges associated with running for and holding political office for people with disabilities. These include a lack of accessibility and resources, stigma, and privacy concerns. We use the case of food allergy to investigate the connection between the lack of descriptive representation and disability: In the United States, over 80 million people have food allergy; despite this, there are no known elected officials with food allergy. Understanding potential barriers that stand in the way of people with food allergies becoming politicians may offer a blueprint for understanding the ways in which other chronic and invisible disabilities are represented in politics. We explore these concerns with two surveys of the public: one investigating potential social desirability concerns in measuring opinion about individuals with food allergy holding public office, and one investigating the potential level of bias toward elected officials with food allergy. We found that the respondents did not seem to feel heavily limited by social desirability concerns as they considered prospective candidates with food allergy. However, it seems that even this disability, which effectively exhibits an "on/off" switch–not a problem much of the time and life-threatening other times–nevertheless does provoke concern from respondents in some circumstances. Through these and future projects, we aim to gain a better understanding of the impact of disability on political candidacy and electability.

BOARD 6B

LILLY COLBECK '27
LUCY JOHNSON '27
EMMA PZEDPELSKI '27

THE STATE OF THE HOUSING MARKET: AN ECONOMIC PERSPECTIVE

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project examines key economic indicators within the U.S. household sector, focusing on the S&P CoreLogic Case-Shiller U.S. National Home Price Index, personal income, and personal consumption expenditures (PCE). The purpose of this analysis is to understand how these variables interact to reflect overall economic conditions, housing market trends, and consumer behavior. Using secondary data from the Federal Reserve Economic Data (FRED) and the Bureau of Economic Analysis (BEA), this study evaluates historical patterns, recent data, and short-term forecasts. The Case-Shiller Index is analyzed using the repeat-sales method to measure long-term changes in home prices and identify housing market cycles. Personal income serves as an indicator of household purchasing power, while PCE reflects consumer spending, a major component of U.S. economic activity. The findings indicate steady growth across all three variables. Personal income has increased at a moderate pace, supporting continued consumer spending. PCE data suggests stable household demand and consistent consumer confidence. Meanwhile, the Case-Shiller Index shows that home prices continue to rise, although at a slower rate than in previous years. Despite these positive trends, the analysis highlights ongoing concerns about housing affordability, as home prices are increasing faster than income. Additionally, factors such as inflation, interest rates, and geopolitical uncertainty may influence future economic performance. Overall, the project concludes that while the U.S. household sector demonstrates stable growth, affordability challenges and broader economic risks remain important considerations for future market conditions.

BOARD 7A

RANJAN SHARMA '27

MORPHOLOGY OF BENADRYL TRIP: STRUCTURAL CHARACTER DESIGN IN INTERACTIVE FICTION

Faculty Mentor: Professor Stephanie Merkel
Department of English

Benadryl Trip is a collaborative interactive fiction game built in Twine (Harlowe 3.3.9) that treats character design as a problem of narrative structure rather than psychological depth. Developed by a five-person team for English 110 "Myth, Legend, and Folklore for Storytellers and Gamers," the game drops the player into a surreal monochrome world alongside five companions, each facing trials, puzzles, and moral choices that culminate in a final reckoning with a godlike judge. The project began with a provocation: what happens when characters are built not from personality but from theory? Vladimir Propp's Morphology of the Folktale supplied the answer in functional terms. Every character in the game exists to perform a role. Companions act as helpers whose usefulness is situational and tied to four stats: intelligence, charisma, endurance, and luck. Donors impose tests. Villains obstruct. The Hero moves forward, not through individual strength, but through interaction with this web of functions. Claude Lévi-Strauss's paradigmatic structuralism sharpened the stakes of player choice by embedding binary oppositions into the game's moral fabric. Deciding who to sacrifice and who to protect is not a matter of preference but of navigating tensions between innocence and corruption, selfishness and loyalty, chaos and order. Carl Jung's archetypal psychology made these structural roles immediately felt. The sage, the warrior, the shadow, and the animal guide do not need backstory to resonate because they tap into patterns of recognition that precede any single narrative. In play, these frameworks stop being abstract. When a companion dies, the story visibly changes. When a stat shifts, new paths open and others close. The presentation includes a live walkthrough of the game alongside critical discussion of how theory became design. Benadryl Trip argues, through its own form, that mythic storytelling principles gain rather than lose power when the audience is no longer just reading but choosing.

BOARD 7B

NAYA BANTI '26

IBERIAN LYNX MONITORING AND POPULATION FORECASTING USING MACHINE LEARNING

Faculty Mentor: Professor Mehwish Abbasi
Department of Mathematics & Computer Science

This project explores how machine learning can be used to support wildlife conservation through image classification and population modeling. Focusing on the Iberian lynx, one of the world's most endangered wild cats, the project combines a convolutional neural network (CNN) with regression-based forecasting to analyze species presence and population trends.

First, a CNN model based on MobileNetV2 was trained to classify images as either Iberian lynx or not Iberian lynx. The model was implemented in a Streamlit web application that allows users to upload images and receive predictions along with confidence scores. Due to the visual similarity between lynx species and other cats, the model includes an "uncertain" classification to handle ambiguous cases.

Second, historical population data from 2014 to 2024 was analyzed using both linear and polynomial regression models. These models were used to visualize population growth trends and forecast future population values through 2030. The results demonstrate that while polynomial regression better captures short-term growth patterns, linear regression provides a more stable and interpretable long-term estimate.

The final product is an interactive application that integrates computer vision and data analytics, allowing users to explore both image classification and population forecasting in one platform. This project highlights how data science and machine learning techniques can be applied to real-world conservation problems and supports the broader goal of using technology to monitor and protect endangered species.

BOARD 8A

OWEN DOOLEY '27
ADRIAN ENRIQUE '27
JOSIAH GROSS '27

WATER ACQUISITION AND SAFETY IN CUBA

Faculty Mentor: Professor Elizabeth Nix
Department of Health & Human Kinetics

Cuba is currently struggling to acquire clean sources of water. These issues stem from multiple factors, rooting from the original water and sewage systems on the island that were installed by the Spanish during their colonial rule of Cuba. Very little maintenance has been done on the system in the five decades since the revolution in 1959. The water scarcity is from a combination of their lacking infrastructure, as well as the economic state of Cuba due to a history of sanctions and inadequate management. Qualitative observational data was collected on water acquisition. Structured observations and informal interviews were held in both Havana Cuba and Pinar del Rio, Cuba to understand the experience of obtaining water as a Cuban person. Our perception of Cuban water issues was skewed because we always had safe water for drinking and cooking/household tasks. Bottled water is available for tourists, but not typically affordable for the average Cuban. The infrastructure in Havana is severely outdated and lacks general maintenance, causing pipes to often leak out a large portion of water before it even reaches faucets/toilets etc. We observed this in Havana, often seeing exposed pipes leaking into the street. Water deliveries were limited to rural areas. Safe water was purchased for one of our accommodations, priced at 50,000 Cuban pesos, or about an average 10 month salary for a Cuban local. Water acquisition affects Cuban citizens almost daily. People go multiple weeks without water due to issues with the hydraulic network. Based on our collective experience and interactions with locals, clean water is currently not easily accessible. Problems are only getting worse, as the fuel shortage affects water trucks' ability to be able to refill people's water tanks – homes will often go uncertain amounts of time before their water is refilled again.

BOARD 8B

LOGAN BILLS '28
MATTHEW DEGRAFT-JOHNSON '28
CONNOR LASCH '27
COLE TULGESTKE '27

INTERNATIONAL BUSINESS NEWSLETTER

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This presentation will cover the international sector of the economy and consist of information from three newsletters. The factors studied will include international trade in goods and services, import and export prices, exchange rates, and global Brent crude and WTI oil prices. The presentation will show how these factors work together to affect both domestic and foreign economies.

BOARD 9A

NIA BARJATYA '27
SUSAN BENINCASA '28
REAGAN SHIFFLETT '28
CAROLINA SOLA '28

FORECASTING INDUSTRIAL SECTOR PERFORMANCE: EVIDENCE FROM INDUSTRIAL PRODUCTION, CAPACITY UTILIZATION, CONSTRUCTION SPENDING, AND DURABLE GOODS

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

This project analyzes the performance of the U.S. industrial sector through three newsletters using four key macroeconomic indicators: industrial production, capacity utilization, construction spending, and durable goods (factory) orders. Each variable is examined in terms of its purpose, method measurement, and historical trends relative to long-term averages. Graphs and tables are used to illustrate patterns and changes over time.

The analysis evaluates how well these indicators describe overall sector activity and whether they present a consistent narrative about economic conditions. It also considers whether each variable acts as a leading or lagging indicator and discusses the limitations of using these measures to represent the sector.

A central focus of the project is forecasting. Predictions are made for each variable in every newsletter and later evaluated for accuracy. Overall, this project provides a data-driven assessment of industrial sector trends and highlights the usefulness of key economic indicators in understanding and predicting economic activity.

BOARD 9B

ALEX SNYDER '26
PARKER TOMLIN '26

THE INFLUENCE OF GRIP ON SHOULDER MUSCLE ELECTROMYOGRAPHIC ACTIVITY DURING RESISTANCE TUBING EXERCISES.

Faculty Mentor: Professor Andrew Busch
Department of Health & Human Kinetics

Resistance tubing exercises are common for baseball players to use for on-field warm-up protocols. Some tubing products are made with handles requiring athletes to grip, and others utilize a velcro wrist-strap. Many athletes claim they 'feel' their shoulders more using handle-products compared to wrist-strap products. It is unclear however, whether better activation of shoulder muscles is achieved when an active-grip is employed (handle) instead of a 'relaxed' hand (wrist-strap). In an attempt to control for different lever-arm orientations of each type of product (handle vs. wrist-strap) this study compared muscle activation in four different shoulder muscles using different grip conditions in healthy collegiate baseball players using the same wrist-strap tubing. Surface electromyographic sensor data was collected from the upper trapezius, infraspinatus, serratus anterior, and lower trapezius in 28 subjects who completed three different sets of ten repetitions of external rotation at 90° of shoulder abduction. The three sets performed in random order consisted of an open hand, holding a handle, or holding a ball. The root-mean squared (RMS) values from the middle six repetitions of each set was analyzed as a percentage of their maximal voluntary isometric contraction (%MVIC). Friedman's tests revealed no significant differences in %MVIC in any of the tested muscles when comparing different grip conditions. This research disproves the effect grip has on shoulder muscle activity using the same wrist-strap tubing. We hypothesize the difference athletes feel using handles is likely due to increased torque demands on the shoulder, as a longer lever-arm requires greater force production, compared to a shorter lever-arm. Even though past research has shown that posture and shoulder/elbow positioning can affect down-stream grip strength, this current study does not support the opposite, and therefore further research is warranted to fully understand the influence grip may have on up-stream muscle recruitment.

BOARD 10A

C.J. ABAHAZI '27
ALEXANDER TOVTYN '27
ZACH HERTZBERG '28

HOUSING NEWSLETTER

Faculty Mentor: Professor Goran Skosples
Department of Economic & Business

This project investigates trends in the U.S. housing sector by tracking three key indicators: the Case-Shiller Home Price Index, Housing Starts, and Existing Home Sales. These variables provide complementary perspectives on housing market activity, encompassing price dynamics, new construction, and overall transaction volume.

The first newsletter introduces each variable in detail, explaining its measurement, release schedule, and historical context. For example, the Case-Shiller Index measures changes in residential home prices using repeat-sales methodology, Housing Starts track new residential construction projects authorized to begin, and Existing Home Sales capture the volume of completed sales of pre-owned homes. Each variable is visualized through graphs and tables to compare current values with historical averages and long-term trends. Forecasts for each variable's next reading are provided based on observed trends and historical patterns.

Subsequent newsletters assess the predictive power and reliability of these indicators, examining whether they provide consistent signals about the housing market and identifying any divergences. We evaluate the accuracy of prior forecasts, consider leading or lagging behavior around economic cycles, and discuss potential limitations of each measure. By connecting observed data to economic theory, we assess how housing market dynamics inform monetary policy decisions and broader economic conditions.
The final newsletter and poster synthesize findings from the semester, highlighting how these variables together create a coherent narrative of the housing sector's performance. Our project demonstrates the importance of housing data as a leading indicator of economic health, offering insight into market trends, forecasting challenges, and policy implications.

BOARD 10B

NAGOMI KATANO '28
INESH TICKOO '26
JEYOUNG SON '27
STANLY SCANDELL '28

DATA PROJECT: INTERNATIONAL

Faculty Mentor: Professor Goran Skosples
Department of Economic & Business

This project examines international economic conditions by using data of global energy prices, exchange rates, import prices, and the United States' international trade balance within the context of national income and business cycle analysis.

Using recent and historical economic data from U.S. Census Bureau and Federal Reserve and Bureau of Labor Statistics and Energy Information Administration, we analyzed how changes in global oil prices influence import prices and trade balance. Additionally, we analyzed movements in foreign exchange rates which determines the impact on the competitiveness of U.S. goods and services in international markets. By connecting these variables, the project explains how external shocks and price movements affects the economy.

ORAL PRESENTATION - 4:30 - 4:50 PM

PEDRO FIGUEIREDO '26

BRINGING VERONA TO OWU: ROMEO & JULIET PUBLICITY CAMPAIGN

Faculty Mentor: Professor Ashley Kennard
Department of Journalism & Communication

This project encompasses the development and execution of a publicity campaign for William Shakespeare's Romeo & Juliet, which was performed at Ohio Wesleyan University on March 26, 27 and 28. It is a Communication major Senior Capstone project focused on marketing and audience-focused communication. It includes visual components (professional videos/photos, posters, teaser trailers, a website, and an Instagram page), as well as written components (theoretical framework, press releases, and results statistics). For the theoretical aspect of the project, Robert Cialdini's 6 Principles of Persuasion was used to attract the target audience, which is composed primarily of Ohio Wesleyan students and Delaware/Columbus area residents. In addition, Intercultural Communication, more particularly, the theory of universalism, was used to reach a broader audience. The project presented outstanding results, with all shows sold out, bringing over three hundred Ohio Wesleyan students and Delaware residents to watch the show.

ORAL PRESENTATION - 4:50 - 5:10 PM

NYX FORSYTHE '27

CASTA PAINTINGS: LEGACIES OF RACISM AND SEXISM IN MEXICO FROM THE COLONIAL PERIOD TO THE PRESENT

Faculty Mentor: Professor Camilla Querin
Department of Fine Arts

During Mexico's colonial history, the Spanish elite were determined to identify and classify the different racial identities being formed by the genetic intermixture of Spaniards, Indigenous and African inhabitants, made visual by the genre of casta paintings. Largely produced within the 18th century, these artworks were typically composed of up to 16 different panels neatly organized in a grid, each depicting and labeling interracial couples and their children, with those of Spanish descent at the top, and people of Indigenous or African heritage at the bottom. These images visually established a racial and gendered social hierarchy that viewed Spanish men as in control of social order, and women and people of color as outcast, afforded less humanity, dignity, and agency. In these representations, class was also inherently related to race, and the social standing of an individual depended on their position within the grid. Casta paintings, therefore, were used as a social tool by the Spanish elite to assert the racial, gender, and class superiority of Spanish men. In this essay, visual analysis is employed to dissect the representations of people of different races to demonstrate that the racial and gendered stereotypes fostered by casta paintings have indeed persisted within contemporary mass media, thus perpetuating a social structure that favors men and people with lighter skin over women and people of Indigenous and African descent. The conclusions of this analysis contradict the official narrative that Mexico is a raceless society, and instead illustrate how racism and sexism still affect and impose limitations on the opportunities available to women and people of color today.

ORAL PRESENTATION - 5:10 - 5:30 PM

JESSIE SPURLING '26

PRESSURE TO CONFORM: HOW LGBTQ+ FAMILY SOCIALIZATION SHAPES GENDER NORMS IN EMERGING ADULTHOOD

Faculty Mentor: Professor Krystal Cashen
Department of Psychology

LGBTQ+ family socialization refers to the ways in which families with LGBTQ+ parents teach their children what it means to be part of an LGBTQ+ family. This study aims to test whether LGBTQ+ family socialization predicts the extent to which emerging adults feel pressure to conform to gender norms. It also examines whether this relationship differs between families where both parents identify as LGBTQ+ and mixed-identity families where only one parent does. Participants (N = 88) in this study are the adult children of LGBTQ+ and mixed-identity parents. Data were collected through an anonymous online survey as part of a broader study examining LGBTQ+ family socialization. Pressure to conform to gender norms was measured using Item 11 from the Rainbow Families Scale, "I felt like I did not have to fit into gender norms" (Lick et al., 2011) LGBTQ+ family socialization was measured using the Same-Sex Parent Socialization Scale (Oakley et. al., 2017). This item served as a measure of parental engagement in gender-related socialization processes. Based on the results, it can be concluded that there is a statistically significant difference in socialization counts across the two family types ($p = .007$), whereas feelings regarding gender norms remain consistent regardless of family structure ($p = .206$). Specifically, the Mann-Whitney U test reveals that being in a certain family category significantly shifts the frequency or nature of socialization practices, even though it doesn't appear to alter the perceived pressure to conform to gender expectations. These findings imply that while family identity is a key driver for social engagement and community interaction, the internal experience of navigating gender norms may be influenced by broader societal factors rather than family type alone. Future directions for this area of research will be discussed to explore why these gender norm perceptions remained uniform across the sample.

ORAL PRESENTATION - 5:30 - 5:50 PM

ROLAND-WILLIAM MCGURR '26

IDEOLOGIES WHICH MERE MODERNITY CANNOT KILL: "THE GREAT WAR IN ENGLAND IN 1897", "DRACULA", & THE EASTERN QUESTION

Faculty Mentor: Professor Mark Allison
Department of English

"The Great War in England in 1897" (1894) by William Le Queux and "Dracula" (1897) by Bram Stoker are both Late Victorian English novels that, seemingly, have very little in common. Despite the differences in their genre, mode, and the political inclinations of their authors, both novels confront the Eastern Question—a term encompassing ongoing geopolitical concerns for various European nations as a result of increasing instability in the Ottoman Empire — in their narratives. Through this, they also address a wide range of linked imperial concerns for the British. An abundance of scholarship has been done on "Dracula", though rarely does it focus on how the novel fits into Eastern Question discourse. Le Queux's work at large is hardly examined in the 21st century, and "The Great War in England in 1897" is typically just a footnote in larger studies of invasion narratives or in a sweeping acknowledgment of Le Queux's vast corpus. In this project, I have analyzed both novels in the context of the Eastern Question, pairing textual evidence from the novels with historical evidence in order to illustrate the ways in which "The Great in England in 1897" and "Dracula" interact with both the Eastern Question and the broader scope of imperial anxieties maintained by Britain at the fin de siècle. I have found that, despite their differences, the novels share many of the same themes of middle-class, British supremacy, the same concerns about the fate of Britain's empire, and the same xenophobic sentiment towards Eastern Europe. Looking at the novels through this political lens allows us to think about the ways in which these works were responding to their zeitgeist as well as prompting us to consider the ways in which these popular works perpetuated and defined these ideologies for their audiences.

ORAL PRESENTATION - 4:30 - 4:50 PM

ARYAA SUBEDI '27

AI-DRIVEN DORMITORY ACCESS: A FACIAL RECOGNITION APPROACH

Faculty Mentor: Professor Mehwish Abbasi
Department of Mathematics & Computer Science

This project focuses on developing a facial recognition-based system to improve dormitory access in a college setting. Traditional methods like keys and ID cards can be inconvenient, easily lost, and sometimes difficult to use, especially for students with accessibility needs. This research explores how artificial intelligence can offer a more seamless and inclusive alternative.

To do this, I built a prototype using facial recognition technology trained on images of Ohio Wesleyan University students, collected with their consent. The system was designed to recognize and verify users in real time, allowing them to enter a dorm without needing a physical key or card. The process involved collecting and preparing data, training the model, and testing it multiple times to improve its accuracy and reliability.

The results showed that the system was able to successfully identify registered users. This suggests that facial recognition could be a practical replacement for traditional entry systems, offering both convenience and a touchless experience. It also has important accessibility benefits, as it removes the need for physical interaction with locks or card readers.

At the same time, the project raised important challenges, such as maintaining accuracy in different environments and addressing concerns around privacy and data security. Future work will focus on improving the system's performance and exploring how it can be implemented responsibly.

Overall, this project highlights how AI can be used to solve everyday problems in a way that is both practical and mindful of user needs.

ORAL PRESENTATION - 4:50 - 5:10 PM

LUKE JOHNSON '27
CHRIS RADMAN JR '27
KIRSTEN QUINN '28

FINANCIAL METRICS AND TRENDS: TRACKING THE KEY INDICATORS OF TODAY'S ECONOMY

Faculty Mentor: Professor Goran Skosples
Department of Economics & Business

Numerous financial metrics and indicators play an important role in understanding the shape and trend of the current financial and economic environment. In our project, we consider the recent history of four financial variables: money stock measures, which quantify the amount of money currently in circulation; stock market indices, which measure the valuation of sectors of companies; consumer credit, which measures the total value of consumer debt, and; the MBA 30-Year Fixed Mortgage Rate, which is the interest rate applied to thirty-year mortgages that have a fixed interest rate. We discuss how these variables have changed over the past several months, what these variables tell us about the condition of the economy, how their movements align with traditional economic theory, and how we predict these values will move in the near future. This project is the culmination of three newsletters published over the course of the last academic semester.

ORAL PRESENTATION - 4:30 - 4:50 PM

ISABEL ALLO '26

INVESTIGATING THE IMPACTS OF THE UNITED STATES FOOD SYSTEM ON FOOD INSECURITY

Faculty Mentor: Professor Christopher Fink
Department of Health & Human Kinetics

Food insecurity, or a situation where access to food is unreliable and inadequate, can impact society at the national, community, family, and individual levels. The structural and systematic limitations specific to the U.S. food system, leave many Americans with uncertainty and an inequitable chance at a healthy life, even though our society has an over-abundance of food. Thus, food can serve as an important lens to examine some of the flaws within our systems in the United States. The U.S. has over 200 food banks that strive to be lifelines for those experiencing intermittent or persistent food insecurity. With this project, I aimed to investigate how community members navigate food insecurity and utilize food banks in the U.S. I visited and spent time volunteering at the Los Angeles Regional Food Bank in Los Angeles, CA, Community Food Rescue in Danbury, CT, and the Mid-Ohio Food Collective in Columbus, OH. I interviewed several community members who were utilizing these organizations and asked about their experiences with accessing food, their thoughts about the U.S. food system, and how their local food bank plays a role. I also conducted interviews with individuals employed at each of the organizations to gain perspective on the differences these programs can make. All participants shared their emotionally-moving stories and provided insight into other factors like access to transportation, wages and rent, and governmental assistance, along with nuanced information about how food banks and their volunteers provide essential support to communities. While this research only scratched the surface of this incredibly important and complex subject, I hope that these findings will aid in developing solutions for creating a more sustainable and equitable food system.

ORAL PRESENTATION - 4:50 - 5:10 PM

KATALINA ABELL '28
LILLIAN BOROFSKY '28
HEKTOR STEPHENS '26
ALLY WOLFF '27

COMPARISON OF AGRICULTURAL PRACTICES IN CUBA AND THE UNITED STATES

Faculty Mentor: Professor Elizabeth Nix
Department of Health & Human Kinetics

Agricultural production in the United States is primarily profits-driven and therefore has a heavy dependence on the use of pesticides and fertilizers. However, there is a growing number of people who prefer organic practices and reduced use of chemicals. Many organic practices have been adopted in Cuba. However, this has been a necessary response due to the collapse of the Soviet Union and limited resources from the United States Embargo. Over spring break, we had the opportunity to look at the food system and organic practices in Cuba through the travel learning course Global Food Systems. We chose to explore the differences between agricultural practices in the United States and how they vary from the organic farms in Cuba. We visited two government run tobacco farms and five privately owned farms where we talked with the people who worked there and observed many alternative and organic practices. For pest control, we observed color-baited pest traps, and natural plant repellents. Water bottle "borders" and terraced slopes were used for irrigation. Low till practices included manual tools, crop rotation, and novel forms of composting. Our observations concluded that agriculture in Cuba is based on resourcefulness, the knowledge shared by other farmers, and the utilization of biodiversity while in the US, agricultural systems are more focused on high crop yield for economic growth and technology-based agriculture. In the US there is large amounts of funding available to provide opportunities for research and development of pesticides and fertilizers, and in Cuba they don't have the financial resources for such products. This has led to a system of sustainable agriculture that relies on natural processes, empirical observations, and use of resources accessible to farmers.

ORAL PRESENTATION - 5:10 - 5:30 PM

KLEVIONE BROWN '28
LEXY STARNER '29

FOOD DEVELOPS COMMUNITY IN CUBA

Faculty Mentor: Professor Elizabeth Nix
Department of Health & Human Kinetics

Industrially produced food has helped to make meal time more efficient and helps people keep up with their busy schedules. Family meal times have decreased in the United States, despite the many benefits. However, in Cuba, pre-packaged foods are rare and expensive, so most meals are made from scratch. This creates more work, but also provides the opportunity to build community. During this we noticed that everyone had a role in developing the end goal of a meal. During our time in Cuba with our Global Food Systems class we studied Cuba's food system, particularly the way in which a meal comes together. Through visiting various farms, peoples homes, and participating in the meal preparation process observed how each meal took a community effort for the final product. We observed firsthand that most meals consisted of minimally processed foods. Nearly all meals consumed in family settings or on farms consisted of meat, a starchy vegetable, rice, black beans, and cabbage salad with vinegar and oil. Each meal takes an extensive amount of time through the whole process from being grown, harvested, and cooked with many roles from a group of people. Our personal experience took about 4 hours from preparation of cooking to cleaning up. Food is a way of life in Cuban culture and family time. We witnessed the preparation, cooking, and eating stages of the meal which brought entire families together through every step. We learned that several generations of a family may live together in one household. This experience demonstrated the noticeable difference between the Cuban culture valuing family generations living as one while the United States culture often does not associate with older generations. This showed that family and food itself has such greater value than it does to family in the United States.

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