



KENT STATE

UNIVERSITY



April 13th, 2026



Undergraduate Symposium on
Research, Scholarship, and Creative
Endeavors

Welcome from the Vice President for Research and Economic Development



I warmly welcome all the undergraduates and faculty mentors involved in the thirteenth annual Undergraduate Symposium on Research, Scholarship, and Creative Endeavors!

It is simply incredible to view the fantastic breadth of scholarship presented by our students, and I encourage all of you to take a few minutes to look around at the posters and presentations of your colleagues.

Hands-on involvement in research and creative activities can be one of the most memorable learning experiences of your undergraduate years and can prepare you for your next step, whether that be graduate study or launching your career. By undertaking a research, scholarship, or creative activity experience while here at Kent State University, you are joining an ever-increasing number of graduates who are not simply learning via lectures and textbooks but who are actively creating knowledge.

To the faculty mentors involved, you have invested great time and energy dedicating yourselves to your research and guiding an undergraduate student through this process. The invaluable skills you have helped refine and bring to life in your mentees will serve them well regardless of their future plans.

Congratulations to all on your posters and presentations and the culmination of all your hard work! I hope you take a minute to think about all you have accomplished, and I look forward to hearing about your future successes.

Sincerely,

Douglas L. Delahanty, Ph.D.

Vice President for Research and Economic Development

Special Thanks to...

Isabella Emerick



Isabella Emerick collected student submissions, edited abstracts, and designed the program brochure for the 2026 Undergraduate Symposium on Research, Scholarship, and Creative Endeavors.

Isabella is a senior English major with a concentration in Professional Writing. Through Kent State's Writing Internship Program, Isabella has worked as a writing intern for the Office of Student Research for the Spring 2026 semester.

Tyette Jones



Tyette Jones was instrumental with compiling, merging, and printing data for event materials. She assisted with the day-of event check-in table and set-up.

Tyette joined Kent State University last year as the Executive Assistant to Vice President for Research and Economic Development and has supported the Office of Student Research during special events.

Denise Joseph



Denise Joseph contributed to the preparation of the Undergraduate Research Symposium by printing schedules, assembling judge folders, and organizing essential materials. On the day of the event, she helped manage the check-in table and provided general support wherever needed to ensure the event ran smoothly and efficiently.

Denise serves as a Special Assistant in the Division of Research and Economic Development and supports the Office of Student Research.

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Aeronautics and Engineering

Wyatt Burke, Senior, Magnetic Resonance Imaging-with AAS Radiologic Technology (Radiologic Imaging Sciences)

Mentor: Abelhakim Al Turk

Polymer-Textile Composite Production Procedure & Application

Fused deposition modeling (FDM) is an additive manufacturing (AM) process that builds parts layer by layer by extruding melted thermoplastic through a heated nozzle. In this study, a LulzBot TAZ Pro(s) 3D printer was used to print thermoplastic polyurethane (TPU) onto organic and artificial textiles to produce textile-polymer composites. This paper investigates the feasibility of production and the industrial applications of 3D-printed textile-polymer composites. Subjects of specific interest are the applications in soft robotics, orthotic medical devices, personal protective equipment (PPE), fashion, and smart textiles.

Daycia Clifford, Senior, Mechatronics Engineering Technology

Mentor: Rui Liu

Exploring Quadruped Robotics: Motion, Sensors, and Practical Implementation

Through my research, I developed a foundational understanding of quadruped robot motion control and sensor integration, using the Unitree Go1 as a case study. By studying impedance control, Bézier curve trajectory generation, Model Predictive Control (MPC), and dynamic modeling approaches such as the Euler–Lagrange formulation, I gained insight into how torque computation and feedback mechanisms contribute to stable locomotion. My analysis of ROS and Gazebo simulations strengthened my understanding of how theoretical control strategies translate into practical hardware–software systems. Additionally, exploring range and tactile sensing technologies deepened my understanding of perception-driven decision making, reinforcing how coordinated control and multimodal sensor integration enable adaptive and reliable quadruped robotic performance.

Mateus Holovaty, Senior, Aerospace Engineering

Mentor: John Sankovic

Optimization of Electrified Aviation Hubs to Enable New Air Transportation Architectures for Connecting Great Lakes Communities

This study examines the operational range and limitations of electric aircraft and develops optimization strategies to enhance regional connectivity to remote and small airports. It focuses on designing an efficient network of recharging nodes across Ohio and the Great Lakes region using shortest-path and energy-optimal routing. The Great Lakes, a major economic corridor spanning several U.S. states and Canadian provinces, offers opportunities to improve mobility and reduce transportation barriers through regional air access. Two aircraft types—a current electric general aviation model and a conceptual advanced design—are analyzed through performance modeling and network simulations. An algorithmic approach identifies optimal recharging sites, balancing range, airport access, and coverage to support sustainable, accessible regional air transport.

Gloria Daniella Kanyana, Senior, Aerospace Engineering

Mentor: Kwasa Benjamin

Development of an Interactive Smart Environment in Extended Reality

Extended reality (XR) technologies are widely used in training and simulation; however, many environments lack reliable interactive control systems. This project developed a real-scale smart environment in XR that integrates manual and automated controls. The objective was to design stable door and lighting systems that maintain consistent behavior while responding to user input and trigger-based automation. The environment was built in Unity using terrain modeling to replicate realistic spatial dimensions. A button-controlled door ensured predictable motion, while a hybrid lighting system allowed manual toggling with automatic activation upon user entry. Testing evaluated responsiveness and state stability. Results demonstrated reliable performance and seamless integration of manual and automated controls. This work provides a scalable framework for intelligent interactive XR environments and future immersive applications.

Zoe Latta, Junior, Aerospace Engineering

Mentor: John Sankovic

Exploring Potential Planetary Influence on Solar Flares

Solar flares are explosions of electromagnetic radiation, often originating from active regions of sunspots. These flares can disrupt communication systems, trigger blackouts, and cause power surges. This research focuses on determining the origin of solar flares and improving strategies to predict their occurrence. It is hypothesized that planetary gravitational pull contributes to tangled magnetic field lines, leading to more sunspots associated with greater solar activity. Using Python, data was retrieved from the GOES satellite database and JPL Application Programming Interface (API) to graph changes in solar activity, and X-ray flux. Evaluating patterns between solar behavior, flare intensity and planetary positioning can provide an estimate of flare incidence and support proactive strategies to minimize damage to technology on Earth.

Richard Marsico, Senior, Aerospace Engineering

Mentor: Hossein Mirinejad

A Real-Time Cyber-Physical Platform for Evaluating Autonomous Fluid Resuscitation

Cyber-physical testbeds are essential for evaluating closed-loop control systems, as pure simulations often neglect delays, actuator dynamics, and hardware-induced nonlinearities. We present a real-time hardware-in-the-loop (HIL) platform for assessing autonomous fluid resuscitation systems. The testbed couples physiological patient models with infusion controllers that regulate fluid delivery to maintain arterial pressure. By interfacing with medical-grade hardware, it reproduces noise, latency, and performance degradation absent in software-based studies. Using this setup, we evaluate a machine learning–driven patient model combined with a radial basis function (RBF) optimal controller, benchmarked against a proportional–integral–derivative (PID) controller. Results highlight the RBF controller’s superior tracking, efficiency, and robustness under hardware constraints, emphasizing HIL testing as a vital tool for validating autonomous resuscitation algorithms.

Aaron Morris, Senior, Aerospace Engineering

Mentor: Jeffrey Balcerski

Shape Memory Actuators for Lightweight Gliders

This study investigates the use of Nitinol shape memory alloy (SMA) wire as a lightweight actuator for a gliding unmanned aerial vehicle. The objective is to reduce the mass relative to the conventional electromechanical actuator system. Unmanned aerial vehicles continue to expand across terrestrial and atmospheric mission applications. Actuators play a critical role in glide efficiency and performance. Traditional servo systems introduce mass penalties that can reduce lift to drag efficiency during unpowered flight. The nitinol wire was evaluated with emphasis on phase transformation on training characteristics, activation requirements, and repeatability during cyclic loading. Material selection considerations include transformation temperature and the capability of material deflection. Aerodynamic performance of the glider configuration was analyzed using steady and incompressible Ansys Fluent simulation to quantify lift production under operating conditions.

Samuel Ndikumuzima, Senior, Aerospace Engineering

Mentor: Benjamin Kwasa

Development of an Interactive XR Environment for Drone Flight, Assembly, and Collision Simulation

This project presents the development of an immersive Extended Reality (XR) platform designed to simulate realistic drone flight dynamics while enhancing structural understanding and safety awareness. The system models pitch, yaw, roll, lift, inertia, and collision response using a physics-based framework integrated with real-time control and detection algorithms. Users can pilot a virtual drone across multiple environments and utilize an “Explode and Reassemble” mode for detailed component inspection. Results demonstrate improved maneuver realism, responsive control behavior, and increased awareness of structural limitations. The platform illustrates how XR technology can serve as an effective tool for aerospace education, conceptual design validation, and experiential learning in drone systems

Abhilekh Paudel, Sophomore, Mechatronics Engineering

Mentor: Michael Fisch

Optimizing Compressive Performance of 3D-Printed Structures Through Infill Geometry and Material Selection

Improvements in additive manufacturing allow engineers to customize the mechanical characteristics of parts with additive manufacturing using internal geometry and material choice. The aims of this work are to compare the compressive behavior and strength of thermoplastic polyurethane (TPU) and polylactic acid (PLA). Cubic specimens of standard procedures were 3D printed and characterized with universal compression testing machine. Assessment of force–time data is essential to understanding peak load and slope behavior. The adaptive cube TPU sample reached the maximum load of 527 lbf and exhibited elastic recovery afterwards. The Rectilinear TPU recorded 198 lbf showing limited recovery only. Failure of the PLA specimens was brittle, with a fracture-like appearance, and without a recovery slope. The incorporation of flexible TPU with optimized infill geometry can incredibly improve strength and durability, as illustrated in these results showing the impact of design on the advancement of additive manufacturing.

Susan Puts, Junior, Applied Engineering (Applied Engineering and Technology Management); Johnathan Puts, Senior, (Applied Engineering and Technology Management)

Mentor: Abelhakim Al Turk

Safety and Facility Guidelines for Ideal Multi-Family Additive Manufacturing Lab

Additive manufacturing (AM) consists of seven distinct technology families, each presenting unique safety concerns and facility design challenges. This paper examines AM laboratories and the associated multi-hazard environments, including fire, chemical, powder, thermal, and mechanical risks. The appropriate safety requirements, facility design, and specific controls and procedures are presented. Engineering controls and training for access are used to propose how to implement the ideal multi-family AM laboratory model.

Lucky Sah, Sophomore, Mechatronics Engineering

Mentor: Jong-Hoon Kim

Biped Robots

This project focuses on designing and developing a bipedal robot inspired by HUBO FX-1 to improve mobility in environments where wheeled robots struggle, such as stairs and uneven surfaces. The research examined how linkage systems and joint placement influence balance, motion efficiency, and stability. A major component involved designing and testing 3D-printed harmonic drive mechanisms to evaluate torque output and overall motion performance while emphasizing cost-effective design approaches. Through iterative testing, the project strengthened understanding of structural support and actuation methods for bipedal locomotion, establishing a foundation for future work in practical and affordable humanoid robotic systems.

Adil Syed, Senior, Aerospace Engineering; Colin Green, Graduate/Alumni, Mechatronics Engineering

Mentors: Tao Shen, Xuanhong An

Radiometer as a New Source of Renewable Energy

Current energy consumption is set to deplete our reserves of fossil fuels in under 100 years. As the global population increases, the demand for energy proportionally increases, so alternative sources of energy need to be developed. A Crookes radiometer is a device that converts light into rotational energy and can be utilized as an electric generator. We started off by creating a theoretical model of the forces behind what causes the vanes in the radiometer to spin. A prototype was then built and connected to a current meter to log how much energy was being generated. Our initial test demonstrated that the radiometer generates a measurable amount of current. Further research will include what specific design parameters can be changed to maximize energy generation.

Architecture and Art

Riley Drabic, Senior, Architectural Studies

Mentor: Elwin Robison

From Handwritten Treatises to Digital Archives: The Evolution of Stained-Glass Documentation and Preservation at Sainte-Chapelle and Notre-Dame

The conservation philosophy of stained glass at Sainte-Chapelle and Notre-Dame has evolved from twelfth-century writings of Theophilus to the data-driven precision of the present day. By analyzing the nineteenth-century interventions of Eugène Viollet-le-Duc and the standardized inventories of the Corpus Vitrearum Medii Aevi (CVMA), this thesis reveals significant changes in conservation approach. The research argues that technologies like Raman Spectroscopy and digital archiving have led to a democratization of heritage, making the study of these monuments globally accessible. Fueled by times of crisis, such as the French Revolution, the World Wars, and the recent Notre-Dame inferno, these cycles of reconstruction and conservation reveal a continuous cycle of adapting to new challenges and technology for stained glass.

Tiffany Nowinski, Senior, Integrative Studies (Integrative Studies-General)

Mentors: John-Michael Warner, Gustav Medicus

Her Legacy: How Artemisia Gentileschi Inspired Post-Modern Feminist Artists

Artemisia Gentileschi developed a visual language of female agency through dramatic realism, self-representation, and a reversal of the male gaze, anticipating core feminist concerns. Her legacy extends beyond the Baroque period as a symbol of autonomy and artistic resistance, particularly through her transformation of personal trauma into narratives of strength. Contemporary artist Cindy Sherman continues this dialogue by using self-portraiture and artifice to critique historical and modern representations of women and expose the constructed nature of femininity. Together, Gentileschi and Sherman confront the objectifying gaze of their respective eras, reclaiming the female body as a site of authorship rather than objectification and paving the way for future generations of women artists.

Emileigh Paulus, Senior, Fashion Design

Mentor: Krissi Riewe Stevenson

No.2: Fashion is Not a Display Case

The Fall/Winter 2026 collection, No. 2, uses fashion as a narrative to explore ambition, determination, and defeat through Anne Boleyn's life story. Inspired by Tudor fashion, this collection reinterprets silhouettes, textiles, and symbolic details to reflect Boleyn's rise and fall of royal influence. Structured bodices, voluminous silhouettes, ruffs, and Elizabethan collars represent desire and authority, while darker palettes, heavy construction, and small embellishment signal defeat. Materials contrast with each other, such as silk paired with leather, expressing vulnerability beneath strength. Color symbolism is present in the Tudor imagery, reinforcing a shift throughout the collection. By transforming a historical dress into contemporary designs, No. 2 becomes a modern narrative that examines how relentless ambition can empower, constrain, and ultimately destroy those who attempt control.

Elena Varner Waltz, Senior, Art History

Mentor: Gustav Medicus

Early Women in The World of Venetian Glass: An Insight into Venetian Bead Stringers.

When one thinks of Venetian artistry and craft, one of the most prominent areas of production that comes to mind is glass production, a typically male dominated field. However, a less well-known piece of history is that women, known as L'imperesse, while not blowing glass, were still instrumental in the production of glass beads beginning in the 13th century. My research uses an explanation of the working of the Venetian glass industry and guild system, terminology, and socio-economic factors that impacted these women's lives, to provide an in-depth explanation of what a Bead Stringer was and what their impact was on the Venetian Glass industry.

Madilyn Ward, Senior, Interior Design; Ashmita Vijayanand, Senior, Interior Design

Mentor: Tina Patel

Gender Neutrality in the Workplace

Women have long carried unequal labor burdens, with invisible emotional labor expected in the home extending into the workplace. This burden is exacerbated by motherhood, as stereotypes negatively affect mothers' professional perception and advancement. While traditional masculine workplace notions frame leadership as aggressive and competitive, fathers are often viewed as more suitable leaders, reinforcing gender bias in the workplace (Bernard & Correll, 2010). Contemporary office models such as hot desking and open plans, though intended to increase collaboration, can amplify emotional labor and diminish autonomy, producing a "Second Shift" (Hochschild, 1989). This research proposes a more equitable, gender-neutral workplace model that addresses spatial, emotional, and privacy needs through literature review, precedent analysis, and survey data.

Biology-Cell

Crawford Barnett, Junior, Computer Science (Data Engineering); Reece Turner, Sophomore, Neuroscience

Mentor: Joseph Bedont

Applying Machine Learning to Integrative Analysis of Sleep and Circadian Behavior Using *Drosophila Melanogaster* Activity Data

Drosophila behavioral assays generate high-dimensional data that is not fully utilized by conventional univariate approaches. We developed a scalable computational framework for multivariate analysis of sleep and circadian behavior in large-scale locomotor activity datasets. Activity from control and sleep mutant flies was recorded under a 12hr:12hr light/dark cycle using *Drosophila* activity monitors. The pipeline integrates standardized preprocessing, automated feature extraction, dimensionality reduction (PCA, UMAP), and clustering (DBSCAN) to reveal behavioral structure, identify subgroups, and assess associations with genotype and sex. This approach demonstrates how computational methods can complement traditional statistical techniques and offer a generalizable strategy for advancing behavioral analysis in neuroscience and chronobiology using machine learning and artificial intelligence.

Joe Benedetto, Junior, Biology (Molecular and Cellular Biology); Payton Ciolli, Graduate, Biology

Mentor: Manabu Kurokawa

Investigating the Role of HUWE1 in HER2-Positive Breast Cancer Using a Mouse Model

Breast cancer is one of the most common cancers in women. HER2-positive (HER2+) breast cancer accounts for approximately 15–20% of breast cancer cases. HUWE1 is a widely expressed HECT-type E3 ubiquitin ligase that promotes the ubiquitination and degradation of specific substrate proteins. Although HUWE1 has been implicated in multiple human cancers, its role in breast cancer—particularly HER2-driven disease—remains poorly defined. To address this gap, we generated a mammary epithelium-specific HUWE1 knockout (KO) in the MMTV-neu (HER2+) breast cancer mouse model. We evaluated the impact of HUWE1 loss on tumor latency and tumor growth by monitoring time to tumor onset and measuring tumor size longitudinally. Using this model, we will discuss how mammary-specific HUWE1 deletion affects HER2-driven tumor initiation and progression.

Anna Dalton, Sophomore, Biology (Organismal Biology)

Mentors: Richard Piet, Allison Renwick

Anterograde Tracing from NeuromedinS Neurons in the Suprachiasmatic Nucleus: Involvement in the LH Surge

The hypothalamic–pituitary–gonadal axis is regulated by internal and external cues that coordinate the timing of ovulation. Rising estradiol activates kisspeptin neurons in the rostral periventricular nucleus of the third ventricle (RP3V), which stimulate GnRH neurons and trigger the preovulatory luteinizing hormone (LH) surge. This process is synchronized with circadian timing signals from the suprachiasmatic nucleus (SCN). Brain tissue from female mice collected during proestrus morning, proestrus evening, and diestrus evening is analyzed for cFOS expression and kisspeptin activation using confocal microscopy. We hypothesize increased cFOS expression in the DMH and increased activation of kisspeptin neurons in the ARC and RP3V during the LH surge.

Cooper DeFrang, Senior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Jennifer McDonough

A New Role for Hemoglobin as an Epigenetic Regulator in Neurons; Implications for Multiple Sclerosis

My lab studies Multiple Sclerosis, a neurodegenerative disease in which the immune system degrades myelin surrounding axons, leading to motor impairment, cognitive decline, and paralysis. We aim to promote myelin regeneration and prevent further damage. Because neurons require oxygen to produce energy, and oxygen is carried by hemoglobin, I investigated where hemoglobin is expressed in neurons. After transfecting a neuronal cell line with DNA expressing hemoglobin, I observed it being present in the cytoplasm using fluorescent antibodies and confocal microscopy. I am now comparing oxygen consumption in cells expressing functional hemoglobin, a nonfunctional mutant, or no hemoglobin. I hypothesize that functional hemoglobin enhances mitochondrial respiration, increasing energy production necessary for myelin regeneration.

Anna Joy, Junior, Neuroscience

Mentor: John Johnson

Exploring Neural Pathways of Immune-to-Brain Communications

Interactions between the immune and nervous systems play a critical role in depression. Infection triggers behavioral changes, including low motivation and mood, called the sickness response, resembling depressive symptoms. Proinflammatory cytokines bind vagus nerve receptors and signal the brainstem nucleus tractus solitarius (NTS), altering neural activity in regions regulating behavior. This study investigated whether *Escherichia coli* (E.coli) exposure activates the amygdala, involved in negative emotions. Male and female adult rats received intraperitoneal injections of saline or low levels of E.coli and perfused four hours later. Immunohistochemistry labeled c-Fos, a biomarker of neural activation, and c-Fos positive cells were quantified. E.coli increased c-Fos in the NTS and amygdala, suggesting immune-induced activation and providing insight into neural pathways linking immune activation to depressive-like symptoms.

William Maynard, Junior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry); Raymond Maynard, Junior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Dinah Qutob

Generation and Expression of SOX3 Constructs to Study the Effects of SUMOylation in Glioblastoma

SOX proteins are transcription factors that regulate differentiation, development, and tissue homeostasis. They contain an HMG-box DNA-binding domain to control gene expression. Dysregulation of SOX genes is linked to cancer and developmental disorders. SOX3 is essential for embryonic neurogenesis and is aberrantly re-expressed in glioblastoma, where it promotes de-differentiation and stem cell-like properties. This study generated wild-type and SUMOylation-site mutant SOX3 constructs to examine the role of SUMOylation. SOX3 was cloned into a pH6HTC-HALO vector, and lysines at K85, K178, and K375 were mutated to arginine. The wild-type construct was transiently transfected into MCF-7 cells, and expression was confirmed using TMR HaloTag® ligand and SDS-PAGE. These results confirm successful SOX3 expression; future studies will assess how SUMOylation affects its localization and transcriptional activity.

Noah Powlison, Senior, Applied Mathematics (Probability and Statistics)

Mentor: Helen Piontkisvka

Gene Editing Patterns in Microgravity

This project explores multidimensional genetic data collected from an experiment run on the International Space Station by Marotta et al. (2024). The original study used neural organoids to represent cortical and dopaminergic brain tissue. These organoids were launched to the ISS, experienced microgravity for 38 days, then were analyzed for gene expression counts. In my work I have used this data and visualized it using GEO2R and R scripts. Descriptive analysis confirmed some of the findings of the original study, namely, identifying Differentially Expressed Genes. Additionally, I explored expression in genes that encode enzymes involved in ADAR editing (ADAR genes), and in Interferon Stimulated Genes (Includes ADARs). My results provide insight into the effects of microgravity on astronauts, notably its amplified impact on neurodegenerative diseases.

Matthew Puleo, Senior, Neuroscience

Mentor: Min-Ho Kim

Magnetothermal Stimulation Promotes Uptake and Clearance of Amyloid Beta in Human Microglia

Alzheimer's disease (AD) is a neurological disorder characterized by beta-amyloid ($A\beta$) deposition. Microglial cells help with phagocytosing and clearing $A\beta$, but are impaired in AD. We sought to investigate the impact of mild magnetic hyperthermia (MNP/AMF stimulation) on human microglia. Following treatment, cells were incubated for uptake and clearance, then stained for microglia and $A\beta$. A total of 120 cells were analyzed, measuring 6E10 signal within each cell's area. MNP-AMF treatment showed higher $A\beta$ signal during uptake and lower $A\beta$ signal during clearance when compared to cells treated with PBS. Our findings indicate that microglia stimulated by MNP/AMF are able to better uptake and clear $A\beta$. Furthermore it supports MNP/AMF feasibility as a new strategy for localized brain stimulation for AD therapy.

Angelina Russ, Senior, Biotechnology

Mentor: Jennifer McDonough

Exercise Induced BDNF Expression and its Role in Multiple Sclerosis

This research focuses on neuronal protection and remyelination in the neurodegenerative disease multiple sclerosis (MS). In Dr. Jennifer McDonough's lab, we investigate Brain-Derived Neurotrophic Factor (BDNF) and its potential role in repairing MS-related neuronal damage. Because MS causes myelin degradation, identifying factors that support remyelination is critical. BDNF promotes neuronal survival and plasticity and may contribute to myelin repair when expressed at elevated levels. To examine this, we compare brain sections from exercise and sedentary mice using immunofluorescent staining for BDNF to confirm neuronal identity. Exercise is known to increase BDNF expression, and we aim to determine where BDNF is most highly expressed and which cells produce it. This work supports therapeutic strategies targeting neuronal health and remyelination in MS and other neurodegenerative diseases.

Alison Staunton, Junior, Biology (Organismal Biology)

Mentor: Helen Piontkivska

The Behavior of Dogs and the Role Genetic Variants Play

There are hundreds of different dog breeds that all have individual phenotypic traits, including size, shape, and behavior. There are different forms of aggression, motives, and outside factors that all influence the behavior of dogs. Many papers suggest that the breed may not be as significant as size, genome, training and environment. I analyzed papers that performed genome-wide genetic association studies (GWA) that compared the genomes of different dogs to find genetic variations. Through this process, specific genomic variants (SNPs) were identified to be significantly associated with genes linked to aggressive traits. Identifying genes that may be contributing to behavioral traits in dogs is important for improving our understanding of their behavior.

CeCelia Stoddard, Senior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Edgar Kooijman

Surface Activity of Lipid Droplet Binding Proteins at the Aqueous-Oil Interface

Lipid droplets (LDs) are ubiquitous organelles found in all living organisms cells and act as energy storage. Its structure is comprised of a neutral lipid core, phospholipid monolayer, and proteins that bind to the surface. Observing the surface activity of proteins on a LD can give us fundamental insight to biological processes. For this work, we investigate the binding properties of lipid droplet binding proteins at the aqueous-oil interface. We use proteins Apolipoprotein A1, Fibrillins 1a and 7a, and Perilipin 3, each of which are involved in lipid droplet binding in plants or humans. Additionally, we study SumoHydrolase as our negative control. By quantifying the change in interfacial tension, we aim to characterize the influence of the physico-chemical properties in binding. This research sheds light on the mechanisms of diseases such as diabetes type II, obesity, and heart disease and applications in biofortification and biofuels.

Ayesha Tariq, Biology (Molecular and Cellular Biology)

Mentor: Helen Piontkivska

Using Gene-Specific ADAR Editing Profiles as Blood-based Biomarkers for Prodromal Parkinson's Disease

Gene specific A-to-I editing mediated by Adenosine Deaminases Acting on RNA (ADARs), can serve as biomarkers to distinctly classify Prodromal Parkinson's Disease cases.

Giovanni Tripi, Senior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Helen Piontkivska

Microgravity-Mediated Changes of RNA (ADAR) Editing Patterns in Human Neural Organoids

Microgravity induces immune dysregulation, inflammation, and altered gene expression, yet its impact on RNA editing remains unclear. ADAR enzymes regulate transcriptomes by editing double-stranded RNA, influencing neural development and immune responses. Dysregulated ADAR activity is associated with abnormal inflammation and cancer-related pathways. Using RNA-seq data from iPSC-derived neural organoids cultured aboard the International Space Station and ground controls (Marotta et al., 2024), ADAR activity was assessed under microgravity. Data was processed with the AIDD pipeline, and editing rates were calculated using custom R scripts. ADAR3 expression differed significantly, and overall ADAR editing rates increased in microgravity. Of ~7,000 differentially edited sites, over 400 contained high-impact edits enriched in various pathways. These results suggest spaceflight disrupts RNA editing and may affect neural and systemic functions.

Reece Turner, Senior, Neuroscience

Mentors: Joseph Bedont, Brandi Besednjak, Emily Welch

How Does Developmental Sleep Deprivation in *Drosophila melanogaster* Increase Sugar Preference in Adulthood?

Developmental sleep loss was shown to disrupt adult courtship behavior in *Drosophila melanogaster*. It has been shown that *Drosophila* alter food preference based on homeostasis, however, this has not been previously linked to broad developmental sleep loss. We found that developmental sleep restriction increases adult sugar preference. I am investigating whether remodeling of the fan-shaped body (FSB) underlies this phenotype. We found that flies sleep deprived post-eclosion significantly preferred a sweet to nutritious substrate to controls as adults. *pdm3* knockdown remodels FSB inputs post-eclosion and increases adult sugar preference, suggesting that FSB remodeling drives adult sugar preference. In future, I will test whether silencing the FSB reverses the effects of post-eclosion sleep loss on adult preference and validating results using alternative methods of sleep deprivation.

Biology-Ecology

Nicholas Brocato, Senior, Biology (Organismal Biology)

Mentor: Lauren Kinsman-Costello

Tracking Differences in Calcium Accumulation Between Adjacent Urban Wetlands

Freshwater salinization from road salt application can alter nutrient retention in freshwater ecosystems. We examined calcium accumulation in two adjacent constructed wetland pools at the Herrick Aquatic Ecological Research Facility at Kent State University that receive urban runoff through water control structures from a shared stream. We collected sediment cores from each pool and analyzed ion concentrations using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES). Results revealed a two-order-of-magnitude difference in calcium accumulation between the pools. One pool exhibited calcium concentrations below 1 mg/g, while the adjacent pool showed values ranging from 50 to over 200 mg/g. This contrast suggests that small-scale hydrologic or sedimentary differences, potentially sediment accumulation near the inflow, may strongly influence salt retention in constructed wetlands receiving urban runoff.

Niah Cohen, Junior, Environmental and Conservation Biology (Conservation Biology)

Mentor: Sarah Eichler

The Fungal Role of Phosphorus Storage in Wetland Ecosystems

Arbuscular mycorrhizal (AM) fungi enhance the uptake of essential nutrients such as phosphorus (P) by expanding the effective root surface of plants. This project investigates how AM fungi can facilitate P removal from the water column by promoting its incorporation into plant biomass. An inoculum containing AM fungi was sourced using trap culturing methods from a local campus wetland and used to inoculate *Asclepias incarnata*, an obligatory wetland plant, which was grown under controlled P-enrichment regimes. We hypothesized that AM-inoculated plants in the low-P treatment group will act as temporary P sinks by sequestering P in biomass. The study will illuminate the capacity of AMF-mediated wetland vegetation to mitigate P driven eutrophication, offering a scalable bioremediation strategy for nutrient-laden water caused by excessive agricultural runoff.

Gustavo de Azevedo Nantes, Senior, Biology

Mentors: Christine Bahlai, Katherine Manning, Thomas Franzem

GusNantes-Abstract

Native bee decline can have severe effects on the environment because they are the primary pollinators in both agricultural and wild settings. We aim to understand the bee community on campus and which plants they are visiting so we can provide supportive habitat to them all season long. With other students, I conducted surveys of 5 areas on campus - 3 ornamental gardens, a prairie, and a wildflower planting. We used modified vacuums, collecting bees within a 15 minute sampling window at each site. The bees were collected into vials and photographed individually. We recorded which plants they were on and uploaded it into iNaturalist. In total, we captured nearly 300 bees and found that higher flower diversity at sites was associated with more bees.

Adam Frymier, Senior, Environmental Studies

Mentors: Sarah Eichler, Gus Holman, Britta, Bielak

Comparing Cultivation Methods for *Ganoderma lucidum* Cultivation and Contaminant Reduction for Architectural Use as Mycelium-Based Composites.

Mycelium-based composites (MBCs) are a newer, sustainable building material with standout features. In terms of cost, recyclability, and strength, MBCs offer a promising direction for architectural and engineering advancements as the industry shifts toward utilizing smarter materials. This study evaluates multiple techniques to improve efficiency by reducing contamination rates, enhancing growth, and assessing overall ease of use. I compare two strains: a commercial Singapore strain and a local Penn State University strain. Under the same growing conditions, I measure the following statistics for each strain and substrate: colonization percentages, mycelial density, mycelial texture, and contamination rates. These observations significantly streamline the cultivation of *G. lucidum* for future use as MBCs, enabling additional mechanical and strength testing to make MBC use more feasible.

Jami Greb, Senior, Zoology

Mentor: Sangeet Lamichhaney

Effects of Seasonal Changes on Gut Microbiome Composition and Diversity in American Goldfinches (*Spinus tristis*)

The gut microbiomes of birds are known to be influenced by environmental factors and aid in physiological processes that may help the host adapt to changing environments. Few studies have examined how gut microbiomes change in response to variation across seasons in wild birds. In this study, we investigated how seasonal changes affect the composition and diversity of the gut microbiome in American Goldfinches and compared differences between sexes, as breeding males display bright yellow plumage, a trait linked to gut microbial activity. We collected intestinal contents for 16S rRNA sequencing to characterize their gut microbiome. Although we observed substantial inter-individual variation in microbiome composition and diversity, we found no consistent patterns associated with season or sex.

Kyle Goertler, Senior, Biology (Molecular and Cellular Biology); Robert Boyd, Graduate Student, Biology

Mentor: Brian Trevelline

Developing a Computer-Vision Model to Quantify Bird Behavior

Behavior is a critical characteristic that shapes the ecology and evolutionary biology of birds. Recent advances in computer-vision object detection modeling offers the potential to address the limitations of traditional observational and scoring methods in behavioral studies. To explore this potential, a computer-vision model was designed to recognize male and female House sparrows (*Passer domesticus*), as well as the objects within their enclosures, in a captive aviary setting. Using the model's object detection output, a framework was developed to automatically quantify the presence, activity, and interactions of the subjects within their enclosures. By translating object detection outputs directly into organized behavioral metrics, the framework enabled continuous measurement of male and female House sparrows. The results provide a methodological foundation for integrating computer-vision models into behavioral ecological studies of avian subjects.

Zaniya Houston, Sophomore, Chemistry (Biochemistry—Pre-Medicine/Pre-Osteopathy/Pre-Dentistry)

Mentors: Sanhita Gupta, Mahli Mechenbier

Hidden Viral Allies in Wastewater

Municipal wastewater may seem ordinary, but it harbors bacteriophages—viruses that naturally attack bacteria. This study investigated Summit County wastewater as a source of coliphages targeting *Escherichia coli*, using host-specific enrichment and plaque assays to confirm phage activity through visible bacterial lysis. Even in the absence of dominant pathogenic *E. coli*, coliphages were consistently detected, highlighting wastewater as an underexplored reservoir of natural biocontrol agents. These findings suggest that naturally occurring bacteriophages could complement traditional sanitation measures, reduce bacterial contamination in food systems, and contribute to public health and environmental protection.

Lad Lubanovich, Junior, Environmental and Conservation Biology (Conservation Biology)

Mentor: Greg Smith

Focused Taxonomic Effort Drive Increases in iNaturalist Observations in Ohio

This study aimed to determine if public surveys increase the number of observations recorded for a focused taxonomic group. Unstructured citizen science applications are new ways for large amounts of biological data to be recorded, by anyone uploading wildlife observations. Because these platforms rely on voluntary participation, different kinds of biases can form when people record observations, and these biases appear in the data. Using data from iNaturalist, trends were analyzed during a focused survey of Odonata, the order that includes dragonflies and damselflies, in Ohio. Since 2011, observations in Ohio have steadily increased, and during the 2017 to 2019 Odonata survey, submissions for this group rose substantially, supporting the idea that public surveys boost observations of a focused taxon.

Helen McLellan, Junior, Fashion Design

Mentor: Sarah Eichler

Quantitative Analysis of Indigo Content in P. Tinctoria Grown Under Different Nitrogen Concentrations

Almost all dyes in the modern textiles industry are synthetic including those used for denim. Local supply chains are uncommon with over 97% of textiles sold in the US being made in other countries. Together, these features lead to significant environmental and societal harms. To counteract these harms, local natural dyes may provide a more environmentally conscious method of dyeing textiles. Polygonum tinctoria, also known as Japanese Indigo, has a long history of use in blue textile dyeing. Natural dyeing and the domestic cultivation of dye goods provides an opportunity for the textile industry to reduce environmental harm. This study looked at the efficacy of indigo dye extraction techniques using the stem and leaf tissue of P. tinctoria.

Ruth Morara, Senior, Environmental and Conservation Biology (Conservation Biology)

Mentor: Dave Costello

Climate Change and Decomposition: How Will Temperature and Precipitation Affect Decomposition Rates in Rivers Under Future Climate Scenarios?

Changes in temperature and precipitation due to climate change can alter ecosystem processes like decomposition. Predicting the effects of climate change on decomposition rates in rivers could tell us how organic matter availability will change under future climates. This study used a global decomposition data set and an existing boosted regression tree (BRT) model to predict stream decomposition rate under future climate scenarios across watersheds with different climates. Future climate variables were extracted from Global Circulation Models and used as BRT model inputs. A sensitivity analysis determined which climate variable(s) had the greatest impact on decomposition. Decomposition rates increased in all but one of the watersheds studied. However, the changes in decomposition rate and the degree of impact of each climate variable were regionally specific.

Kendall Myers, Senior, Biology

Mentor: Matthew Lenhert

Transition Metal Patterns and Structure-Function Relationships in Mole Crickets Support the Metal-Prioritization Hypothesis

Transition metals augment the properties of the cuticle of many insect lineages, often providing increased hardness to structural tools. Thus far, few studies have focused on the distribution of metals among different structures within individuals. It was hypothesized that the abundances of metals within the cuticle of structures is dependent on the physical forces those structures experience. CLSM, SEM-EDS, and nanoindentation were used to study the properties of three structures of two closely related mole cricket species. Our hypothesis was not supported. Even though they perform the same functions, the same structures did not have a similar elemental profile between species. However, there was a pattern in metal allocation which prioritizes the enrichment of structures that are most important to fitness. We term this “the metal-prioritization hypothesis,” and found the life history traits of the studied mole cricket species provide support for this new hypothesis.

Camryn Myrla, Junior, Anthropology (Biological Anthropology)

Mentor: Rafaela Takeshita

Fecal Glucocorticoid Metabolites and Dehydroepiandrosterone Sulfate as Stress Biomarkers in Lemurs and Gibbons

Stress hormones can be monitored in wildlife by measuring fecal glucocorticoid metabolites (FGCM) with enzyme immunoassays (EIA). An emerging alternative is dehydroepiandrosterone sulfate (DHEAS), which has been validated as a stress indicator in numerous species. This research sought to monitor stress levels in three primate species before and after relocation to new enclosures. We aimed to validate an EIA to measure FGCM and DHEAS in lemur feces, and to track DHEAS levels in siamangs and gibbons with a previously validated assay. A sharp increase was observed in the lemur’s FGCM levels following transportation. DHEAS levels temporarily peaked in one siamang and in one gibbon after relocation. Measuring stress hormones can help zoological institutions assess care, as observable behaviors may not accurately reflect physiological stress.

Tamera Owens, Sophomore, Public Health (Pre-Medicine, Dentistry, Osteopathy)

Mentors: Lauren Kinsman-Costello, Daiyanera Kelsey

The Relationship Between Organic Material and Active Carbon in a Newly constructed Wetland

The purpose of this study was to evaluate spatial differences in active soil carbon within a newly restored wetland by using permanganate oxidizable carbon, or POxC, as an indicator of microbially available carbon. POxC also reflects the labile fraction of soil carbon by providing fast-acting results and is well-suited for assessing soil health. We collected twenty-two 6-inch and 12-inch cores to measure depth from across the north and south sides of the pilot watershed in Dunkirk, Ohio, which differ in proximity to Shallow Run, an agricultural ditch stream. We hypothesized that the areas closer to Shallow Run would exhibit levels of active carbon due to greater moisture content and saturation. However, the results showed there were no significant spatial differences in active carbon. Elevation and other environmental factors, such as climate on the day of sample collection or organisms, may better explain variability in microbial available carbon distribution.

Allison Remick, Senior, Zoology

Mentor: Brian Trevelline

Under the Shell: Exploring the Relationship Between Bacterial Abundance and Lysozyme in Lizard Eggs

Microbes are known to influence the traits of many vertebrate species, but little is known about how they affect early life development. Recent studies demonstrate the existence of microbial DNA within wild vertebrate eggs, suggesting microbial communities are present. It is unknown whether these microbes are living due to high levels of the bacteria-killing enzyme lysozyme. To address this knowledge gap, we sought to: (1) determine whether lizard eggs contain viable microbial communities, and (2) test whether lysozyme concentration influences bacterial abundance. Upon collecting lysozyme and bacterial abundance data from within individual eggs, bacterial abundance appears unaffected by lysozyme concentration. These results, combined with culturing data, suggests the presence of lysozyme-resistant bacteria and supports the hypothesis that living microbes are present within vertebrate eggs.

Lauren Sigrist, Senior, Environmental and Conservation Biology (Conservation Biology)

Mentor: Greg Smith

Exploring AI Applications: Utilizing Artificial Intelligence to Detect and Identify Fauna Caught on Camera Traps

Artificial intelligence (AI) is a prevalent topic that has the potential to be useful in many fields of study. To comprehend reasonable applications of AI, the system's abilities and limitations need to be more clearly defined. One proposed application of AI is the use of the AI system's ability to catalog and analyze data at a rapid rate. This could be vastly useful for research by decreasing time and manpower needed for projects. To better understand AI application in the field of biology, my research explores the website WildlifeInsights. WildlifeInsights has an AI system designed to identify fauna present in camera trap images. To explore the possible limitations of the system I have chosen to use data from three different locations: Ohio, Florida, and California.

Benjamin Scott, Senior, Environmental and Conservation Biology (Conservation Biology)

Mentor: Ferenc De Szalay

Mosquito Species Composition in Urban vs. Rural Ditches

Certain mosquito species carry specific diseases that pose a risk to human health. Because pest treatment for adults is tricky and typically doesn't yield great results, treatment methods are commonly applied for their larvae. Our area of interest is in urban and rural ditches that mosquitoes have laid eggs in. By understanding the difference in species between both habitat types, treatment methods can be centered around just the mosquito larvae that are known to vector diseases.

Isabel Traska, Senior, Botany

Mentor: Sarah Eichler

Pollinator Activity in Sustainable Flax Fields Relative to Wildflower Habitats

Sustainable agriculture attempts to balance production and ecological health, however the role of fiber crops such as flax (*Linum usitatissimum*) in supporting pollinators remains unclear. This study assessed pollinator activity in a sustainably managed flax field compared to a local wildflower field. Weekly sampling was conducted from July 2 to August 6, 2025, during which actively foraging bees were collected for 15-minute intervals and identified. No bees were recorded in the flax field during the sampling period, whereas multiple species, including *Bombus* spp., honeybees, carpenter bees, and metallic green bees, were observed in the wildflower field. These findings suggest that flax provides minimal seasonal resources compared to wildflowers. Flax may contribute other ecosystem services however plant diversity is essential for supporting pollinators in agricultural landscapes.

Biomedical Sciences

Rishi Ahuja, Junior, Biotechnology

Mentors: Robert Clements, Jennifer McDonough

Metabolic and Epigenetic Regulation of Oligodendrocyte Maturation and Myelin Production by N-acetyl-L-aspartate

Myelin, produced by oligodendrocytes (OLs), is essential for neuronal transmission but is degraded in Multiple Sclerosis (MS). N-acetyl-L-aspartate (NAA), a neuronal metabolite, is shown to regulate OLs and is reduced in MS brains. We aimed to investigate the effects of supplementing NAA on OL metabolism, myelination, and epigenetic modifications.

Oligodendrocyte precursor cells (OPCs) isolated from rat embryos were treated with NAA and analyzed using respirometry assays, showing NAA-related alterations in the oxidative and glycolytic tests. Western blot assessed the epigenetic markers and checked for the purity, and RNA-seq clarified the gene expression and pathway changes (analysis in progress). To simulate myelination, OPCs were cultured on 3D printed artificial axon scaffolds and subjected to immunocytochemistry. Confocal imaging showed an increase in myelin expression with NAA treatment.

Lauren Aultz, Junior, Speech Pathology and Audiology; Avery Flood, Junior, Speech Pathology and Audiology; Cassidy Shaffer, Junior, Speech Pathology and Audiology

Mentor: Ali Barikroo

Loading the Swallow: Effects of Bolus Consistency and Effortful Swallow on Submental Muscle Activation in Older Adults

Age-related declines in swallowing are partly associated with reduced recruitment of the submental muscle group. Weakness in this region has been linked to swallowing difficulty. Bolus modification is frequently used as a compensatory strategy to provide temporary airway protection in individuals with dysphagia. This study examined effects of bolus consistency and swallow type on peak sEMG amplitude in adults ≥ 60 (n=25). Participants completed dry, thin liquid, pudding, and solid swallows under regular and effortful conditions. Effortful swallows produced greater peak amplitudes than regular swallows, and activation progressively increased with thicker boluses. These findings suggest that both effortful swallowing and bolus modification can be used to enhance submental muscle recruitment and may inform rehabilitation strategies for older adults with dysphagia.

Kamil Balci, Biology (Molecular and Cellular Biology); Carter Sharpnack, Junior, Biotechnology

Mentor: Helen Piontkivska, Andy Maravillas

Analysis of Gene Expression and ADAR Editing in Fluoroquinolone Treated Astrocytes Exposed To Cadmium.

Fluoroquinolones are widely used antibiotics with reported neurological side effects. We reanalyzed RNA-seq from human astrocytes exposed to cadmium (Cd10) then treated with moxifloxacin or levofloxacin. Cadmium altered expression of 7,325 genes (>1.5 -fold, $p < 0.05$); fluoroquinolones modulated $>5,500$ genes. Cd10 reduced ADAR expression by 24.9% (69.2 $\rightarrow$ 52.0 TPM, $p < 0.001$) and significantly suppressed A $\rightarrow$ I RNA editing across regulatory regions independent of ADAR expression. Intronic editing fell (global index 0.90 $\rightarrow$ 0.52 with levofloxacin, $p = 9.02 \times 10^{-6}$); 3'UTR editing also decreased ($p < 0.034$). A rise in missense variants suggests increased protein recoding under stress. The dissociation between ADAR quantity and editing impairment implicates altered RNA editing in fluoroquinolone neuro-immunomodulatory effects.

Gabrielle Blankenship, Senior, Biology (Molecular and Cellular Biology); Payton Ciolli, Graduate, Biology

Mentor: Manabu Kurokawa

Fatty Acid Regulation of Breast and Ovarian Cancer Cell Survival

Metabolic reprogramming is a hallmark of cancer and has been extensively studied, particularly glucose metabolism. However, the role of fatty acids in regulating tumor cell growth and survival remains less defined. Emerging evidence suggests that fatty acids can promote proliferation, while inducing lipotoxic stress. To investigate how dietary fatty acids influence cancer cell viability and signaling, we examined the effects of palmitic acid, oleic acid, and linoleic acid on breast/ovarian cancer cell lines. Cells were treated with individual fatty acids, with cell death quantified by flow cytometry. Activation/inhibition of kinase signaling pathways and oncogenic markers were assessed by Western blot. These results suggest that fatty acid-induced lipotoxicity and survival signaling are context dependent and may contribute to subtype-specific metabolic vulnerabilities in breast/ovarian cancers.

Lorna Benden, Junior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Helen Piontkivska

Shifts in ADAR editing in Mouse Model Of Huntington's Disease

Huntington's Disease (HD) is a genetic neurodegenerative disorder due to abnormal expansion of CAG repeats in the huntingtin (HTT) gene. Recent studies have identified the increase in inflammation markers in HD patients, including changes in RNA editing, although the precise link between inflammation and HD neurodegeneration remains unclear. CAG repeats in the HTT gene can induce dsRNA-sensing pathways that affect ADAR expression and can also form dsRNA hairpins, providing a substrate for ADAR action indicating a potential link between HD pathology and ADARs. To address this link, publicly available transcriptome data was re-examined from the mouse model of Huntington's disease (BioProject PRJNA557238) to identify HD-associated changes in patterns of ADAR editing. Some mice, despite the progression of their HD and the severity of the dysregulation of their genes, exhibited a "good" performance in a battery of tasks and behavioral tests. Thus, we focused on differences between "good" and "poor" performers. The results showed that ~1900+ genes are differentially expressed based on the interaction between genotype and performance. Of these genes, ANO2, was the most dysregulated, with the opposite patterns of expression between "good" and "poor" performers. While overall expression of ADAR loci appeared to not be significantly different, we identified multiple genes with significantly different patterns of ADAR editing, varying by genotype and performance. Among differentially edited genes were Prkar1b, linked to autism and Parkinson's disease, and Kif5a, linked to Autism, Epilepsy, Polyneuropathy, and ALS. Our preliminary findings reflect the nuanced contribution of ADAR editing to the HD pathogenesis.

Zach Boyden, Senior, Neuroscience

Mentor: Colleen Novak

Muscle Thermogenic Effects of Direct AMPK Inhibition in the Ventromedial Hypothalamus of Rats

5'AMP-activated protein kinase (AMPK) of the ventromedial hypothalamus (VMH) is important for homeostasis and thermogenesis. This study targeted the VMH AMPK pathway using AMPK inhibitor SBI-0206965. We hypothesize that higher concentrations of SBI-0206965 would cause a temperature increase in skeletal muscle and BAT. Rats were implanted with cannulas in the VMH and temperature transponders in the interscapular region and gastrocnemius muscles. Rats were given microinjections of SBI-0206965 in various concentrations (1 μ M, 10 μ M, 20 μ M) and artificial cerebrospinal fluid (aCSF) vehicle. Baseline temperatures were recorded before microinjections. Immediately after, temperatures were recorded at normal intervals for 4 hours. We found that AMPK inhibition can alter thermogenesis through VMH signalling. Although this may not be a significant dose dependence, as each concentration showed similar temperatures.

Grace Davis, Senior, Neuroscience; Reece Turner, Junior, Neuroscience; Allison Yearwood, Neuroscience

Mentors: Joseph Bedont, Brandi Besednjak

Does Autophagosome Accumulation Negatively Modulate the Effects of Alzheimer's Disease Related Sleep Disturbances?

The early stage of Alzheimer's disease is characterized by amyloid beta plaques outside of neurons. These plaques cause sleep loss, fragmentation, and sun downing. The autophagy pathway is a lysosomal process associated with "cleaning" out the cells' "trash" into vesicles known as autophagosomes. which is impaired by both sleep loss and amyloid. Our previous research using a Drosophila model found a partial rescue of Alzheimer's related sleep loss by preventing accumulation of autophagosomes. Our study aims to confirm this effect is due to effects on autophagy, specifically the prevention of accumulated autophagosomes, and not alternative pathways, by targeting additional components of the autophagy pathway in amyloid Drosophila and measuring sleep. Our current sleep data indicates trends toward partial sleep rescue from preventing autophagosome accumulation.

Taylor Dimmerling, Sophomore, Neuroscience

Mentor: Ronald Seese

Revealing the Autonomic Substantia Nigra

The substantia nigra is a midbrain region involved in dopamine signaling, motor control, reward processing, and autonomic regulation. Degeneration of its dopaminergic neurons contributes to Parkinson's disease, which is marked by prominent autonomic dysfunction. However, the specific substantia nigra subregions involved in autonomic control remain unclear. To address this, we identified substantia nigra neurons that influence autonomic release using trans-synaptic rabies virus tracing. Because the central autonomic network differs between primates and rodents, we completed this work in a common marmoset, a non-human primate. Neurons in both the pars compacta and pars reticulata were mapped across the anterior-posterior axis. Labeled neurons were distributed throughout both subregions, particularly in lateral areas, suggesting widespread substantia nigra involvement in adrenal regulation.

Avery Flood, Junior, Speech Pathology and Audiology; Lauren Aultz, Junior, Speech Pathology and Audiology; Cassidy Shaffer, Junior, Speech Pathology and Audiology

Mentor: Ali Barikroo

Spontaneous Swallowing Frequency as an Objective Screening Indicator of Dry Mouth in Older Adults

Dry mouth (xerostomia) is common in adults over 60 and can cause difficulty chewing, swallowing, speaking, increased dental decay, and reduced quality of life. Since self-report measures may be unreliable, especially with cognitive decline, this study examined whether spontaneous swallowing frequency (SSF) could serve as an objective screening indicator. Forty-seven adults aged 60 and older participated; 21 reported xerostomia and 26 did not. Participants watched a silent video for 10 minutes while swallowing sounds were recorded and analyzed to calculate swallows per minute (SPM). Those with xerostomia showed significantly lower swallowing frequency ($M = 0.51$) compared to those without ($M = 0.85$), $p = .011$. ROC analysis showed moderate screening ability ($AUC = 0.70$). Reduced SSF may provide a simple, noninvasive screening tool for xerostomia.

Ashley Knowlton, Sophomore, Neuroscience

Mentor: Wilson Chung

Environmental Pollutants Influence Epigenetic Control of Fertility

Environmental pollutants (EPs) are leading causes of disruption in the reproductive systems. These disruptions affect epigenetics within mice. TET1 is a known demethylator that regulates gene expression. In mice, we found that the GnRH neurons had a reduced number due to TET1 mutation. To better understand TET1 function, we investigated the effects of TET1 mutation on gene expression using RNA seq to analyze changes in the hypothalamic transcriptome. Our analysis revealed a number of TET1-dependent genes that may help regulate the reproductive systems within mice. These results are being verified with qPCR and used to discover TET1-dependent reproductively relevant biochemical and cellular signaling pathways. Future research will investigate how MC-LR exposure may act on these TET1-dependent genes and signaling pathways.

Ray Maynard, Junior, Biology; William Maynard, Junior, Biology

Mentors: Dinah Qutub, Adam Underwood

SUMOylation of SOX3: A Post-Translational Switch for Glioblastoma Stemness

SOX3 is a transcription factor that regulates neural development and stem cell differentiation. In glioblastoma, SOX3 is abnormally re-expressed, promoting tumor proliferation and stem-like characteristics. SUMOylation is a post-translational modification that regulates transcription factor function, but its role in SOX3 remains unclear. This study generated recombinant SOX3 constructs to investigate predicted SUMOylation sites using a prokaryotic expression system. The SOX3 coding sequence was subcloned into a pH6HTC-T7-HALO+HIS vector, and predicted SUMOylation sites (K85, K178, K375) were mutated to arginine. Constructs were expressed in *E. coli* and analyzed using SDS-PAGE and western blot. Successful expression confirms a functional platform for future in vitro SUMOylation assays to identify modified residues and study SUMO-dependent regulation of SOX3 in glioblastoma.

Aliyah Ross, Senior, Neuroscience

Mentor: Wilson Chung

The Effects of MC-LR Ingestion On Pregnant Mice

Freshwater safety is threatened by the increased population of cyanobacterial harmful algal blooms. Cyanotoxins, like microcystin, are toxic to the liver, spleen, and nervous system. Microcystin leucine arginine (MC-LR) is one of the most common and toxic forms of cyanotoxins. Less is known about the effects of MC-LR on pregnant mice physiology. We hypothesize that longer exposure to higher doses of MC-LR increases the apoptosis level in the liver and spleen of dams. Dams were assigned to vehicle (water), 1 $\mu\text{g/kg}$ MC-LR, or 10 $\mu\text{g/kg}$ MC-LR and were gavaged daily for 12 or 18 days. H&E analysis showed that 10 $\mu\text{g/kg}$ MC-LR decreased the spleen apoptotic cell density after 12 days, compared to 1 $\mu\text{g/kg}$ MC-LR, suggesting that lower levels of MC-LR affect immune pathways more than higher doses.

Madelynn Spicuzza, Junior, Biochemistry (Chemistry)

Mentors: Collen Novak, Jahan Nusrat

Semaglutide and Its Interaction With Muscle Thermogenesis

Weight loss drugs are becoming more and more accessible. While we know semaglutide's impact on weight loss, we investigated its potential to affect muscle thermogenesis in rats. To probe its effects on thermogenesis we treated rats with the drug and a control solution, then using implanted thermometer transponders we measured the heat produced by skeletal muscle and back brown adipose tissue as it changed with exposure to a predator threat, a stimulus known to cause a rapid induction of muscle thermogenesis. We saw a significant rise in temperature after exposure to predator odor in rats treated with semaglutide. This suggests that the drug may have potential interaction with certain thermogenic brain or muscle pathways.

Emily Surgenor, Junior, Pre-Medicine/Pre-Osteopathy

Mentor: Helen Piontkivska

Transcriptomic Analysis Reveals Neurologic Pathways Impacted By Temporal Changes to ADAR Editing Following a Traumatic Brain Injury

Traumatic Brain Injury (TBI) is a neurological disorder caused by an external force, including falls, accidents, sports, and interpersonal assaults (Ginsburg & Smith, 2025). Annually, 50 million cases risk permanent disability and neurodegeneration (Wang, 2025). Vulnerability is modulated by age and sex, with Intimate Partner Violence (IPV) representing a "silent" critical subset of repetitive neurotrauma. This computational study used a public dataset to analyze ADAR-mediated RNA editing. Metadata was stratified by age and sex to simulate IPV and athletic injury patterns. Global RNA editing diverged significantly by day 29 post-TBI, despite stable ADAR expression. Molecular recovery signatures varied by age and sex, through circadian and Alzheimer's pathways remained consistently dysregulated. ADAR editing is a key driver of TBI sequencing. These sites offer sex and age specific biomarkers for personalized recovery monitoring post-TBI.

Aurora Villanueva, Senior, Biology (Molecular and Cellular Biology)

Mentor: Robert Clements

Investigating Demyelination & Remyelination: Effects That Adenine Has on the Kidney

Demyelination is associated with disease states such as multiple sclerosis, encephalomyelitis, as well as many others. Adenine has been identified as a potential small molecule treatment to enhance remyelination; however, higher doses are known to be associated with kidney injury. In this study, both demyelination and remyelination were studied separately, within four groups of mice (6 animals per group), including control + adenine (D/R), cuprizone + adenine (D/R), control + vehicle, and cuprizone + vehicle. This study was conducted for about 6 weeks, during which demyelination, remyelination, and kidney histology were evaluated in each animal by H & E staining, fluorescence, and brightfield microscopy. Studies are ongoing to determine kidney condition, while adenine is a potential therapy to reduce brain damage in demyelinating states.

Logan Yost, Senior, Neuroscience; Phaedra Keller-Norrell, PhD Student, Neuroscience; Brad Casali, Neuroscience

Mentor: Erin Reed- Geaghan

Neonatal Estradiol Induces Sex-Specific Changes to Microglia in 5xFAD Mice

Alzheimer's disease (AD) is a neurodegenerative disorder that disproportionately affects women. Microglia are central to AD pathogenesis, display sex differences, and are crucial for neurodevelopment. Estradiol (E2) organizes the brain in a sex-specific manner during development, guided by microglia. This study provides insight into estradiol's role in the sex-patterning of microglia. We used a masculinization model driven by neonatal E2 administration in mice to induce brain masculinization. Cytoarchitecture, gene expression, and protein concentration were examined via Immunohistochemistry, qPCR, and JESS. Though significant differences weren't observed in cytoarchitecture, significant changes were detected in sex-dependent gene expression and in X-chromosome inactivation protein concentrations in a region- and genotype-specific manner. This suggests E2 masculinization in cortical and hippocampal regions is driven by molecular, rather than structural, differences.

Business

Tanitoluwa Alabi, Senior, Economics

Mentor: Ikpe Akpan

Leveraging Generative AI for Small Business Growth

Small businesses play a significant role in economic growth in every country, but often struggle with limited resources and rising competition. Artificial intelligence (AI) tools, especially generative AI (GenAI) and conversational chatbots, create new opportunities to improve productivity, efficiency, and business decision-making. This study synthesizes the current literature on GenAI adoption by small and medium-sized enterprises (SMEs) to enhance firm performance, productivity, and efficiency. The findings suggest that GenAI can improve operational efficiency and increase productivity, while the deployment of a conversational chatbot helps SMEs offer 24/7 customer support and provide instant responses to customer questions, services that would otherwise be unaffordable. GenAI's data analytics capability also enables informed decision-making. Any successful adoption depends on leadership commitment, employee training, organizational readiness, and change management.

Carly Barns, Freshman, Zoology; Olivia Bockey, Freshman, Interior Design; Hawanatu Kabia, Freshman, Interior Design; Emerson McIntyre, Freshman, Nursing; Sage Vucelich, Freshman, Fashion Design

Mentor: Mason Schulz

Pay Park Plus- Flashes Future Development Plan

“Pay Park Plus- Flashes Future Development Plan” is our proposed idea to improve the parking availability on the Kent campus. Our plan is to convert underused parking lots, including selected faculty lots, into temporary paid parking lots in order to trial run our project. We will then build new lots on underutilized land that Kent State University already owns. Not only will our idea benefit students and faculty by making parking more convenient and removing an unnecessary stressor from everyday life, but it will also benefit the university by making ineffectively used land into profitable spaces that will pay for themselves. After successfully implementing our plan we hope to eliminate any negative experiences that might push future applicants away, while keeping our current students joyful.

James Beck, Senior, Accounting

Mentor: Wei Li

The Effects of Press Releases Before, During, and After Merger and Acquisition Occurrences on the Stock Market

Dr. Wei Li and I continued our project from 2024 seeking to determine the effects of press releases before, during, and after merger and acquisition occurrences on the stock market. After collecting and analyzing data on a multitude of M & As, we were able to confirm that there is a connection between these press releases and the ensuing stock price. The process included data cleaning and reformatting with the goal of isolating only data that pertained to true M & As while removing stock buyback transactions.

Aarya Bista, Sophomore, Economics

Mentors: Rowena Cornelius, Kathryn Wilson

Gendered Time Allocation in Developed and Developing Economies: A Comparative Study of US and Ghana

This study analyzes how women allocate time to paid work, unpaid household labor, caregiving, and leisure in developed and developing economies, comparing the United States and Ghana. Conducted through the Summer Undergraduate Research Experience under the mentorship of Dr. Rowena Cornelius and Dr. Kathryn Wilson, the project uses nationally representative time-use data to examine how economic structure, social norms, and institutions shape women's daily activities. Results show that women in Ghana spend substantially more time on unpaid labor, reflecting limited access to labor-saving technologies and the prevalence of informal employment. Women in the United States devote more time to paid work and leisure, supported by formal labor markets and greater childcare availability. Despite these differences, women in both countries shoulder disproportionate unpaid work burdens globally.

Fatemeh Mahmoodzadeh Bayghara, Senior, Business Management

Mentor: Philip Wang

Balancing Tourism and Preservation through Sustainable Practices and Smart Resilience: A Case Study of Cuyahoga Valley National Park in Northeast Ohio

Cuyahoga Valley National Park (CVNP) attracts nearly three million visitors annually, creating growing pressure on its ecological and cultural resources. This study examines how sustainable practices and smart resilience strategies can balance tourism growth with long-term preservation. Using a mixed-method case study approach, field observations were conducted across six high-traffic park areas to assess visitor density, environmental stress, and infrastructure conditions. Findings indicate concentrated overuse during peak periods, highlighting the need for adaptive management. The study proposes data-driven solutions, including real-time monitoring, visitor-flow prediction, reservation systems, and community collaboration. These strategies aim to enhance visitor experience while protecting natural assets, offering a transferable framework for sustainable tourism management in U.S. national parks.

Rowan Oliphant, Senior, Marketing

Mentor: Haithem Zourrig

How Consumers Perceive Delivery Robots: Autonomy, Failure, and Abuse

Autonomous delivery robots are transforming urban and campus transportation, improving efficiency while raising concerns about vandalism and abuse. This research examines how consumers perceive robots through autonomy and anthropomorphism, service failure, and judgments of abuse and punishment. Three survey based studies were conducted. Higher perceived autonomy significantly increased speciesism, indicating that when robots are viewed as acting independently, consumers draw a sharper distinction between humans and machines. In service failure scenarios, perceived control varied, but perceived severity did not, as participants focused on the outcome of not receiving their food. Perceived abuse predicted judgments that a robot deserved punishment, while empathy was not significant. Findings demonstrate autonomy cues, outcome based reasoning, and behavioral evaluations shape consumer responses to robots and inform design and service decisions.

Chemistry

Jordon Caraway, Senior, Chemistry (Chemistry)

Mentor: Yaorong Zheng

Employing Second and Third Generation Click Chemistry for the Effective DNA Loading of Pt Prodrugs

Platinum prodrugs have been well established as a therapeutic agent in cancer research and treatments. Its binding capability and interaction with DNA has been an effective killing agent. However, the tunability of such products has led us to develop scaffolds that introduce light controlling agents such as dyes to direct the reactivity of these synthesized products. In this project, we introduced a modification of lysine, an essential amino acid, to a carboplatin core as well as incorporated click chemistry based reactive sites for the purpose of controlling activation and DNA conjugation as well as simplifying the chemical synthesis.

Hannah Ferguson, Senior, Chemistry (Chemistry)

Mentors: Christopher Fenk, Jeffrey Mighion

A New Method for a Safer Flame Test and [3+2] Cycloaddition Work

The first half of my project focuses on the development of a new method for a safer flame test demonstration. The flame test is used to illustrate the emission spectra of various metal ions when they are excited by heat. Our goal was to create a safer version of this demonstration while still being able to enjoy and share the vibrant color display. The second half of my project focuses on the optimization of various [3+2] cycloaddition reactions between nitrile oxides and an array of α,β -unsaturated cyclic alkenones to produce 2-isoxazolines. The reaction was optimized by testing equivalents of alkene, solvent type, reaction concentration, temperature, and reaction time. Additionally, the nitrile oxides were dimerized to produce a set of furoxans for study by X-ray crystallography.

Danielle Kozlowski, Senior, Biology (Molecular and Cellular Biology)

Mentor: Elda Hegmann

Fabrication of PEG–OCL Scaffolds as Antibacterial Platforms for Bone Tissue Engineering Application

Although scaffold biomaterials represent a significant advancement in healing damaged bone tissue, the risk of microbial infection can have catastrophic consequences. To synthesize antibacterial scaffolds, PEG (polyethylene glycol) and OCL (Oligo(ϵ -caprolactone)) were combined in various percentages. OCL was utilized due to its biocompatibility, stability, and biodegradability. PEG was included because of its antibacterial properties. Therefore, these materials can be an appropriate combination for antibacterial bone scaffolds. Scaffolds were fabricated with PEG incorporated at 20%, 40%, or 60% (w/w), with two replicate scaffolds prepared for each composition. Agar plates were streaked with *Escherichia coli* before placing a scaffold at the center of the dish and incubating. The 40% PEG scaffold resulted in a small zone of inhibition (ZOI), and the 60% PEG scaffold resulted in a complete absence of bacterial growth.

Micah Lockhart, Junior, Biochemistry (Chemistry); Dominick Nero, Junior, Biochemistry (Chemistry)

Mentor: Sajaya Abeysirigunawardena

YBX1 as a Dual Epitranscriptomic Reader

Epitranscriptomic regulation of gene expression involves post-transcriptional chemical modifications of RNA. N6-methyladenosine (m6A) is the most abundant RNA modification and is dynamically regulated by methyltransferases known as writers and demethylases known as erasers. The functional outcome of m6A-modified transcripts is determined by reader proteins that recognize these methyl marks. Y-box binding protein 1 (YBX1) is an RNA-binding protein previously characterized as a reader of 5-methylcytosine (m5C), a less abundant RNA modification. YBX1 contains a conserved cold shock domain that binds single-stranded RNA and stabilizes methylated transcripts. Because similar peptide motifs can recognize both m5C and m6A, we investigated whether YBX1 functions as a universal methyl reader. Our findings demonstrate that YBX1 binds both m5C- and m6A-modified RNAs, suggesting broader roles in epitranscriptomic regulation and disease.

Abdulmuqeet Mohammed, Senior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Farid Fouad

Thiophene Functionalized Selenides as Polymerizable Catalytic Derivatives for Peroxynitrite Sensing Interfaces

We present the synthesis of three thiophene selenide derivatives, compounds 1, 2, and 3 as electrochemically polymerizable selenides. Thin films of conducting polythiophene functionalized with selenide moieties are electrochemically grafted on electrodes producing new selenide-based peroxynitrite (PON) sensitive sensors. Electropolymerization of 3-thienyl-phenyl-selenide, 1; 3-(3-selenophenyl)propylthiophene, 2; and 3,4-ethylenedioxythiophene, EDOT selenide derivative, 3 and subsequent measurements of PON detection sensitivity revealed that selenide decorated polythiophene coated electrodes are superior to graphite electrodes decorated with a diaryl selenide as PON detectors. Simple selenide 1 showed the best sensitivity, followed by derivative 2, while the EDOT selenide derivative, 3 exhibits the lowest PON detection sensitivity among the three thiophene derivatives. Mechanistic studies of the electrocatalytic sensing is underway.

Shane Price, Senior, Environmental and Conservation Biology (Conservation Biology)

Mentor: David Costello

The Art of Water Sampling

The EPA does checks of freshwater bodies for lethal amounts of heavy metals once every couple of years. These tests usually occur in the daytime when the heavy metals in the water have attached to the sediment. When the sun goes down, these metals get released as there is no sun to keep them in place. The question then becomes is there a significant difference in the amount of metal being measured at night vs the daytime? I spent the summer studying water sampling in general. There are two main reasons for running water tests. I looked into water sampling methods through the lens of monitoring an ecosystem's health and success.

Emily Richards, Senior, Biochemistry (Chemistry)

Mentors: Alexander Seed

Synthesis of a Photoactivatable HNO Donor Molecule that is Designed to Enhance HNO Release via an Intramolecular Trap

Nitroxyl (HNO), is a molecule that has shown promise in the treatment of various medical conditions; however, its rapid dimerization and short half-life make it difficult to study directly. We are designing HNO donor molecules capable of releasing high concentrations of HNO on demand, enabling future studies of the mechanistic interactions between HNO and biomolecules. Known HNO donor molecules give an oxime byproduct when photoactivated. This suggests that the carbocation intermediate is trapping the HNO as it is released. The aim of this project is to avoid this unwanted side reaction through intramolecular trapping of the carbocation through formation of a stable-five-membered ring.

Maelee Thompson, Senior, Biochemistry (Chemistry); Chathurani Ekanayake, Graduate Student, Chemistry

Mentor: Sanjaya Abeysirigunawardena

Investigating the Impact of 5-methylcytosine (m5C) on RNA Modifications on ‘RNA-Protein’ Interactions

5-Methylcytosine (m5C) is a prevalent nucleotide modification in eukaryotic mRNA that regulates gene expression at both transcriptional and translational levels. Abnormal m5C levels are linked to diseases including neurodevelopmental disorders, diabetes, and cancer. This study investigates how m5C modifications influence RNA–protein interactions during epitranscriptomic regulation. Phage display experiments were conducted using m5C-containing model RNAs with consensus sequences for the methyltransferases NSUN2 and NSUN6, which install cytosine methylation. Peptide alignment analysis identified enriched peptides that specifically bind methylated RNA, suggesting potential methyl-reader functions. Future work will characterize these peptides and evaluate their roles in neurodevelopmental disease mechanisms. Overall, this study contributes to revealing the molecular mechanisms underlying gene expression regulation and offers insights into potential therapeutic targets in human diseases, like breast cancer and neurodevelopmental disorders.

Computer Science / Mathematics

Christian Auman, Senior, Computer Science; Fnu Neha, Senior, Computer Science

Mentors: Deepshikha Bhati, Angela Guercio

Prompt Studio - Interpreting Stable Diffusion Through Structured Prompts and Cross-Attention Attribution

Prompt engineering is crucial for guiding text-to-image AI models, but it's often unclear how specific words in a prompt shape the generated images. To address this, we developed PromptStudio: an interactive tool that helps users build and analyze prompts by breaking them down into categories like style, mood, and viewpoint. PromptStudio also uses visual maps to show which words in a prompt influence different parts of an image. This lets users see, in real time, how changing their wording changes the image. In a study with 37 people, users found PromptStudio made it easier to improve their prompts and understand the model's behavior. Our work helps make AI image generation clearer and more accessible to everyone.

Manima Hamal, Junior, Aerospace Engineering; Cecilia Ruby Tirkey, Graduate, Computer Science

Mentor: Jong- Hoon Kim

AI Teaching Assistant for Real-Time Classroom Support: Enhancing Teacher-Student Interaction and Learning in K-12 Visual Programming

In traditional classrooms, engaging students in coding and robotics education remains challenging, particularly when class sizes are large for a single instructor to manage. Monitoring individual progress and identifying students who require assistance demand innovative solutions that address diverse learning needs and encourage active participation. This study introduces a Real-Time Student Monitoring System that integrates artificial intelligence (AI) technologies with tangible robotics programming. The system employs an AI-driven classroom monitoring framework to continuously track student engagement and learning progress, providing real-time support by notifying teachers when intervention is needed. It captures data such as visual programming codes, snapshots, and engagement metrics derived through emotion recognition. Large language models (LLMs) evaluate coding accuracy and analyze performance, generating actionable prompts to highlight areas of concern.

Samaa Hediya, Sophomore, Computer Science

Mentor: Richard Ferdig

AI Virtual Training for Public Health Worker

This project examines the use of artificial intelligence to create a virtual training scenario for public health education. Community health workers often face challenging environments that may include health hazards and difficult social interactions. The project focuses on the design of a 360° virtual apartment environment that includes environmental risks and an AI-generated resident with resistant behavior. The virtual scenario is intended to support training in communication, risk awareness, and professional decision-making. This work highlights how AI supported virtual environments can be used as an educational tool to support public health training.

Isha Gupta, Junior, Computer Science

Mentor: Raiful Hasan

Security and Privacy Vulnerabilities in AI-Powered Wearable Devices: A Threat Analysis of Ray-Ban Meta Smart Glasses

Wearable artificial intelligence technologies like Ray-Ban Meta AI glasses embed cameras, microphones, and real-time AI assistance into everyday eyewear. These devices enable hands-free communication, object recognition, and instant text reading, providing meaningful accessibility support, particularly for individuals with visual impairments. As adoption of smart wearables expands, such devices are becoming increasingly integrated into social, professional, and assistive environments. However, their continuous perception of surroundings introduces significant security and privacy concerns. The glasses can capture images, record audio and video, and extract visible text, creating risks of unauthorized collection of sensitive information, including personally identifiable information (PII) and confidential data. This research analyzes these vulnerabilities through threat modeling and scenario-based evaluation to emphasize the need for stronger privacy protections in wearable AI systems.

Harpreet Kaur, Junior, Computer Science

Mentor: Maha Allouzi

Game-Based Cybersecurity Education Platform for K–12 Students

The cost of cyberattacks runs in trillions of dollars annually, and it happens to be so because people do not have the simplest cybersecurity knowledge. Meanwhile, cybersecurity professionals are highly scarce. To resolve the two concerns, I created a web-based platform consisting of four interactive games that were based on Ohio Cybersecurity Learning Standards. The platform has a Racing Quiz Game, a Detective-Adventure Mystery that teaches to identify cyber threats, a Red vs. Blue Team strategy card game, which educates about risk management, and a Network Builder Simulation where students are asked to design and defend secure systems. The platform also gives teachers a platform where they can track student understanding through dashboards. This project will help develop early digital literacy by presenting the concepts of cybersecurity using interactive, game-based learning and will aid the selection of a more robust cybersecurity workforce in the future.

Meheraj Khatri, Junior, Computer Science

Mentor: Younghun Chae

AI in Education: A Systematic Literature Review of Opportunities and Integrity Risks

This systematic literature review (SLR) studies and analyzes up-to-date 60+ research papers/journals and organizes findings of 40+ that are in relation to “AI” and "education." It explores how AI has and will influence the education sector and its operations by redefining education with better outcomes and new and updated methods. The findings reveal that there are positive developments but also a negative impact caused by not enough information, rules, and guidelines. The AI deployment not paired with regulatory, ethical, and international governance frameworks can be a major problem. A Python data pipeline using pandas was engineered to automate the integration of four disparate datasets we collected by removing duplicates and cleaning records to create a unified research repository that is easier to analyze.

Cody Sherman, Senior, Computer Science

Mentors: Johnathan Maletic, Joshua Behler

Identifying Saccadic Eye Movements in a Software Development Environment

Eye tracking shows how programmers process code during code reviews. By matching the category of each movement to a section of code, we can determine that code's readability. The toolkit for iTrace aims to do just that but lacks a means of discerning saccadic eye movement and the information that comes from it. My work took one of iTrace's algorithms (The I-VT) and modified it to allow it to partition raw gaze data into either fixations or saccades. The results calculated several aspects of these saccades, including speed, length, and spatial elements. The results were then stored in database for future analysis. The inclusion of saccadic information will allow us to understand the full picture of developer behavior in regard to coding practices and help improve code review efficiency.

Trispa Singh, Junior, Actuarial Mathematics

Mentor: A. Bathi Kasturiarachi

Optimization of Mutual Fund Portfolio Allocation Using Linear Programming and Correlation Analysis

This research applies Linear Programming and correlation analysis to optimize portfolio allocation among large-cap, mid-cap, small-cap, and U.S. Treasury mutual funds. Using annual return data from 2015–2025, statistical measures including mean return, volatility, and correlation were calculated. An optimization model was developed to maximize expected return subject to risk and budget constraints. Results show that incorporating Treasury funds improves diversification due to lower correlation with equities. The optimized portfolio produced lower variance compared to an equal-weight strategy, demonstrating the value of mathematical optimization in structured investment decision-making.

Elizabeth Sowa, Junior, Mathematics

Mentor: A. Bathi Kasturiarachi

Triple Prime Numbers and Their Relevance in Cryptology

The RSA algorithm is a cryptological algorithm that was designed to securely encrypt messages taking two consecutive prime numbers and multiplies them together to create a large, difficult-to-factor number. We wondered if it was possible to make the algorithm more secure by using prime triplets, which are sets of three consecutive prime numbers. To determine whether this was possible, we first had to determine whether there was a finite number of prime triplets; and second, we had to find whether there was a way to rearrange the RSA algorithm to input three numbers. While it is still undetermined how many prime triplets there are, it was found that the RSA algorithm can be modified to take three numbers, although it is impractical

Education and English

Isabella Emerick, Senior, English (Professional Writing)

Mentors: Mahli Mechenbier, Linda Spurlock

Human Identity and Nature: Bridging the Gaps Between Science and the Arts Through the Study of Science Fiction and Fossils

Science fiction is a vast genre with many published works that range in topics. Only, where is the inspiration for science fiction coming from, and how do these inspirations influence the themes of the story? Three works of science fiction were selected, *Frankenstein* by Mary Shelley, *Remarkable Creatures* by Tracy Chevalier, and *Clan of the Cave Bear* by Jean M. Auel. Eight peer-reviewed articles were selected, along with a field report written on Shanidar Cave by Ralph Solecki. Fossils were acquired or observed in public museums that related to the novels. The results indicated that there was a sparked correlation between scientific publications and its integration into the selected stories. The common theme between the novels was human connection and its unrestricted nature.

Kaylyn Hornbeak, Senior, Mechatronics Engineering Technology

Mentor: Abelhakim Al Turk

Surveying Barriers to STEM Higher Education for Low-Income High School Students

This study explores how limited STEM curriculum in underfunded northern Ohio high schools affects students' readiness for STEM pathways. A survey administered to low-income high school students revealed reduced access to labs, hands-on projects, and real-world learning. These gaps restrict skill development and create barriers to pursuing STEM degrees. Additionally, this paper examines the barriers that discourage or prevent students from pursuing STEM degrees in college.

Emilie Miller, Senior, English (General)

Mentor: Michelle Baldini

Analyzing The Adventures of Tintin as a Fairy Tale

Conceived in early 1929 by Georges Remi, better known as Hergé, The Adventures of Tintin has become a major influence on Western literature. The bande dessinée (comic), like fairy tales, has endured over time as a graphic novel for children. With origins in oral tradition, fairy tales have evolved into modern, literary tales. Tintin functions as a 20th-century literary fairy tale, conveying ubiquitous morals to its readers; thus, elevating the comic beyond being exclusively for children. Acknowledging Tintin as a fairy tale acknowledges its elasticity and relevance to its audience.

Jacob Schmidt, Senior, Art Education

Mentor: Linda Hoeptner Poling

Fiber as Methodology: Fiber-Based Community Art Education within a Homeless Shelter

Fiber art practices such as weaving, stitching, felting, and dyeing hold deep cultural and historical significance but remain underrepresented in art education. This research explores how fiber-based methodologies can support community-based art education and wellbeing through drop-in artmaking sessions at a local homeless shelter during the summer of 2026. Using a qualitative narrative case study and Arts-Based Action Research approach, the researcher serves as both an educator and a participant observer, facilitating flexible, process-focused lessons responsive to participants' needs. Data collection includes field notes, reflective journals, documentation of artwork, and interviews with shelter staff, while maintaining voluntary, confidential participation in accordance with IRB ethical standards. Preliminary analysis examines themes of community building, self-agency, identity expression, and material engagement. The project aims to develop a practical curriculum model supporting inclusive, community-based art education beyond traditional classroom settings.

Sofia Stamati, Sophomore, Translation (Spanish)

Mentor: Sonia Karkare

Media Literacy Toolkit: Strengthening Digital Critical Thinking Among Kent State Students

In an era of rapidly evolving digital media and artificial intelligence, discerning accurate information from misinformation and disinformation has become increasingly difficult, especially for audiences who engage heavily with social media and consume all kinds of information. Recent studies show that over half of U.S. adults struggle to determine whether the news they encounter is true or false (Pew Research Center, 2025), highlighting the need for stronger media literacy education. This project examines media literacy levels among Kent State students through the development of an interactive, quiz-based media literacy toolkit. Informed by research and interviews, the toolkit introduces key concepts such as misinformation versus disinformation, media framing, and AI-generated content. The goal is to assess students' skills while promoting critical thinking and more informed digital media engagement.

Exercise Science / Nursing

Haley Adams, Senior, Nursing

Mentor: Janet Reed

Turbulence and Triage: Comparing VR Anxiety Across Disciplines

Simulation is widely used in nursing and aeronautic programs, where human error can have serious consequences, but simulations may increase student anxiety and hinder learning. Virtual reality (VR) is increasingly integrated with manikin-based simulation, making it important to understand student perceptions and associated anxiety. This study compared nursing and aeronautic students' qualitative perceptions of anxiety during VR simulation. Two structured focus groups were conducted in Fall 2025—one with nursing students and one with aeronautic students. Transcribed interviews were analyzed using thematic analysis. Nursing students reported lower anxiety with VR than with traditional manikin simulations, while aeronautic students experienced higher anxiety. Both groups valued VR and manikin-based simulations. Despite anxiety, students viewed both simulation modalities as essential for real-world preparation.

Priscilla Boateng, Sophomore, Nursing

Mentor: Richard Adams

Educational Developments Among Immigrant Children

Urban Vision is a non-profit organization in Akron that is committed to supporting immigrants childrens through academic and emotional development. Many immigrant children face challenges such as language barriers and cultural adjustments. Through observation during my internship, I reviewed some tutoring and fundraising activities. All this support contributes to improving academic development. I realized that consistent support and good educational structure play a big role in a child's life. These findings reinforce the critical role holistic community programs play in shaping long-term academic and personal development. Observations have shown that holistic community-based programs not only address educational needs but also contribute significantly to long-term development. Overall, this study highlights the significance of a comprehensive community in shaping and influencing positive outcomes for immigrants.

Katelyn Brown, Junior, Nursing

Mentor: Janet Reed

Student Anxiety in VR and In-Person Nursing Simulations

Simulations are essential in nursing education but are also common causes of student anxiety. As virtual reality (VR) simulations are increasingly being integrated into nursing programs, their impact on simulation anxiety is currently underexplored. This study examines differences in student anxiety in in-person and VR simulations. A qualitative thematic analysis was conducted using transcripts from twenty-nine students interviewed after their first VR simulation. Most students reported experiencing less anxiety in VR than in in-person simulations. Reduced anxiety was attributed to decreased perceived social evaluation, as VR's immersive and individualized format reduced distractions and minimized the feeling of being observed. Simulation anxiety in VR was attributed to technological unfamiliarity and time constraints. These findings suggest VR may help reduce simulation anxiety, though further research is needed.

Ainslee Capehart, Junior, Nursing

Mentor: Dana Hansen

Healthcare Access in Rural Appalachia: Examining Structural Inequities, Cultural Perceptions, and Policy Innovation

Healthcare access in Appalachia is impacted by structural challenges and cultural perceptions. Bourke et al.'s rural health framework highlights factors that limit availability and affordability of care, focusing on women's health. To examine how structural and cultural determinants impact healthcare access and outcomes. This review analyzed studies on rural Appalachian populations published between 2020 and 2025. Databases included Google Scholar, PubMed, and CINAHL. Exclusion criteria included a lack of quantitative data, were not US-based, and without focus on Appalachia. Structural and cultural differences were consistently associated with reduced access, poorer outcomes, delayed care, and maternal healthcare engagement. Policy and technological innovations showed mixed but promising results. Healthcare access is shaped by structural and cultural factors. Sustainable improvement requires widespread systemic change to promote equitable care.

Domenic DeBellis, Sophomore, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Adam Jajtner

Relationship Between Dietary Intake Relevant to Granulocyte and Monocyte Subset Mobilization Following Eight Days of Cycling Training

This study examined how diet influences granulocyte (GR) and monocyte (MO) subset responses to repeated aerobic exercise. Ten men completed 8 days of cycling (90 min, 65% VO₂max); fasting occurred on day 1 (D1) and day 8 (D8). Diet was assessed using ASA24 and expressed relative to resting metabolic rate and body mass–adjusted protein (PRO) and carbohydrate intake. Blood collected pre-exercise through 24 h post was analyzed for GR counts and MO subsets; changes were correlated with diet. On D1, GR and classical MO changes were inversely related to PRO early post-exercise. By D8, total and intermediate MO responses were positively related to kcal intake. Kcal and PRO intake influence leukocyte responses to aerobic exercise.

Ellayna Meloy, Sophomore, Nursing

Mentor: Loretta Aller

Stress to Strength: Bioindicators in Pre-Licensure Nursing Education

Nursing students have reported an increase in stress levels relating to their education. The purpose of this national, multi-site study is to explore the relationship between stress and pre-licensure nursing education. We are using physiological and reported experiences in order to track how students experience stress. The experiences suspected to be stressful are exams, simulation, and attending clinical studies although we are interested in any other events as well. It's tracked via the Garmin Vivosmart 5 mobile fitness device which tracks Automatic Stress Score and Heart Rate Variability. The students then self-report using the Ilumivu app to describe how they felt during their experiences. The study is currently ongoing, so we don't have results yet. However, the predicted results would be an increased heart rate variability, stress scores, and reported stress during their tracked experiences.

Punarjai Pratap, Junior, Exercise Science (Exercise Physiology)

Mentor: Adam Jajtner

Effects of Cold-Water Immersion on Athletic Performance and Recovery

High-volume resistance exercise reduces lower-body explosive performance, commonly measured by vertical jump (VJ) height. This study examined changes in VJ performance following a high-volume lower-body resistance session and compared recovery effects of immediate cold-water immersion (CWI), 24-hour delayed CWI, and placebo ultrasound over 48 hours. Participants completed baseline testing, performed a high-volume resistance protocol, and were reassessed immediately, 24 hours, and 48 hours post-exercise. Vertical jump height significantly decreased immediately after exercise and remained suppressed at 24 and 48 hours across all groups. No recovery condition resulted in a faster return to baseline performance. These findings indicate that neither immediate nor delayed CWI enhances recovery of explosive power within 48 hours following high-volume resistance training.

Trinity Rudolph, Senior, Nursing

Mentor: Dana Hansen

The Effects of Firearm Law, Firearm Policy, and Intimate Partner Violence on Black Pregnancy-Associated Homicide

The primary purpose of the literature review is to analyze whether stricter firearm law and policy decreases pregnancy-associated homicide in Black women. The method of research is a narrative literature review using databases and hand-searching. The result was that restrictive firearm law and policy decreased pregnancy-associated homicide rates (-3.74 deaths per 100,000 live births from 2011 to 2019; Wallace et al., 2021); however, there is not enough focused research on Black women to know how they are specifically affected. The differences between results for Black women can be explained by the theoretical framework of intersectionality. To bridge this gap, nurses can use their skills to advocate for law reform and increase research in this area.

Coleman Wood, Senior, Exercise Science (Pre-Physical/Occupational Therapy/Podiatric Medicine)

Mentor: Meghan Magee

Recovery Strategies in Collegiate Athletes

Recovery plays a critical role in preparing athletes for training and competition, as well as reducing soreness and supporting overall performance. This survey-based study examined recovery practices among 69 NCAA Division I athletes across seven sports. Athletes reported the types of modalities they used, when and where they used them, perceived effectiveness, and sources of education. Foam rolling, massage guns, and ice baths were the most common methods, with 65% using recovery strategies immediately after practice and more than half using them before competitions and lifting sessions. While most athletes used modalities in the athletic training room, 58% also used them at home. Sixty-five percent rated their methods as effective, and 91% learned them from athletic trainers, highlighting the influence of accessibility and education on recovery choices.

Fashion Design

Alison Byron, Senior, Fashion Design

Mentor: Ja Young Hwang

Under the Ocean

I wanted to create a children's collection using de-stashed and deadstock fabric to last for generations. I designed this collection for all girls aged 6-9, keeping growth, play, and adventure in mind. De-stashed and deadstock materials I acquired through estate sales and deadstock sections in fabric stores were utilized. I had young family members and an after-school group, coloring sea creatures to add color to the print. I am adding extra pockets throughout the collection so that children can collect small things like little stones, shells, and acorns during their adventures. I focused on using elastic, stretchy fabrics and adjustable elements, such as straps and waistband elastic. This will allow room to grow and to be worn and passed on for a long time.

Eduarda Candeo, Senior, Fashion Design

Mentor: Ja Young Hwang

Saudade

Saudade began with the desire to reduce waste in the fish leather industry, a material once considered only a byproduct of food production, yet inherently rich in beauty, value, and cultural meaning. By using skins that would otherwise be discarded, this work offers a sustainable solution to the waste generated by the fishing industry, while also honoring the Ribeirinho community, a resilient group whose livelihood is deeply intertwined with the natural resources of the Amazon. By valuing Pirarucu leather, the collection not only supports a more sustainable supply chain, but also contributes to the economic and cultural preservation of these communities. These values are combined with a personal desire to expose my country and its identity. Inspired by Brazilian waters, Saudade reflects movement, depth, and connection to nature. The final work is feminine and unique, blending the strength of this material with fluid fabrics in natural tones, creating a balanced dialogue between resilience, softness, tradition, and the natural environment.

Emily Cranston, Senior, Fashion Design

Mentor: Krissi Riewe

EveryBody Wear: Designed With Fashion and Function in Mind

EveryBody Wear is a women's adaptive, ready-to-wear collection for Autumn/Winter 2027. The collection adopts a person-first approach, prioritizing the needs of women with physical disabilities over aesthetics and trends. Each garment is specifically designed to have adaptive closing and opening features, making it easier for each wearer to add and remove clothing. Magnetic snaps, custom zippers, and comfortable fabrications are featured in the collection that match the overall retro 70s aesthetic, which features prominently throughout the collection. A warm color palette, bold patterns, and boho chic elements are presented in a more modern and functional way. EveryBody Wear takes the adaptive clothing market and the trends in women's fashion and beautifully blends them to make a functional fashion collection.

Kendall Crotty, Senior, Fashion Design

Mentor: Ja Young Hwang

Do I Look Like Them

My collection is designed around creating colorful, interesting, and flattering looks for women ages 35-60. My collection is based around all the women in my life who have meant so much to me and have supported me through my journey to becoming a designer. I wanted my collection to have a classic feel to it by borrowing a lot of silhouettes and styles from decades like the 1960s and 1970s. I also wanted the looks to still have some edge to them, so I created some very modern single motif patterns for my t-shirt and used a lot of buttons, which has been trending in my looks.

Aeris Hernandez-Diaz, Senior, Fashion Design

Mentor: Ja Young Hwang

Cultural Stories of the Earth and Sea: Guides to Sustainability

With the guidance of cultural stories, this collection intends to explore a unique perspective to sustainability. These folkloric stories have a historical influence upon humanity as they reflect their relationship with nature, carrying a respectful fear while seeking balance and harmony alongside nature. Grounded in folkloric thematics, the purpose of this research is to utilize cultural stories as a guide for designing sustainably folklore-inspired garments. In this study's process, the cultural stories of South Korea, Mexico, and the Celtic Nations work to provide visual motifs, sewing techniques, and inspiring silhouettes to pull from with regards to the Earth and Sea. Further acting as a guideline for textile selection, ultimately resulting in the usage of only natural fibres and natural dye materials found in these countries.

Eryn Gadson, Senior, Fashion Design

Mentor: Ja Young Hwang

Female Psyche

I am researching the psyche of multigenerational women and its effect on gen-z women in the western world to better understand how I can use fashion to create a collection that opens conversations to the evolving and nuanced female psychoanalyses. Each look embodies the women of every era and their loss of control in the strive towards the concept of perfection – the battle then being passed down cyclically through the patriarchy.

Ethan Griffin, Senior, Fashion Design

Mentor: Krissi Riewe

Jamboree

Jamboree is a ready-to-wear menswear collection that considers explorations of outdoor culture, guided by the designer's family histories of outdoorsmanship. Designed to fill a gap in the Big and Tall market, Jamboree creates an elegantly sentimental image, that remains approachable and refined, for men outside the typical size range. By engaging the visual codes of outdoor culture as a form of material and visual heritage, Jamboree frames Big and Tall menswear as a space to create new versions of heirloom pieces. Familiar silhouettes are softened through thoughtful construction and handicraft references. The resulting collection challenges the austerity of traditional outdoor apparel, finding both tension and harmony between the rugged and tender, repositioning symbols of survival and self-reliance as tools of expression.

Jacob Jones, Senior, Fashion Design

Mentor: Ja Young Hwang

Against the Order

My collection explores the generational disconnect between Generation Z and the United States military, which serves as a catalyst for the inevitable resistance to entrenched conservatism. It examines the tension between institutional tradition and emerging values. Utilizing a lot of structured fabric clashed with light weight fabrics. While also subverting traditional silhouettes ultimately allowing for a reinterpretation of tradition. With these subverted silhouettes I wanted to make sure my garments take up both physical and intellectual space. Banksy was a huge inspiration for my collection. Using my own flower tattoo as a nod to his "Flower Bomber" piece. This motif is seen throughout the collection creating a collection that challenges the norm and the growing conservative movement.

Anne Krukli, Senior, Fashion Design

Mentor: Ja-Young Hwang

Renascer

Renascer is a collection that transforms forgotten fabrics into new narratives through upcycling and handmade work. Inspired by the strength, diversity, and creativity of Brazilian nature, this collection celebrates the handmade work as a form of resistance and renovation. More than aesthetics, Renascer aims to address one of the most important problems in the fashion industry: the overproduction of fabrics. Instead of creating new materials and generating more residue, this collection utilizes exclusively deadstock and reused fabrics, giving value to what already exists. This collection offers a conscious solution to fabrics that might not have the correct destination and possibly end up in landfills. Renascer transforms these fabrics into unique pieces that are full of meaning, environmental responsibility, and respect for the natural cycle of life.

Cecelia Leffler, Senior, Fashion Merchandising

Mentor: Narmin Nasibli

Perceptions of AI Generated Fashion Design

In the fashion industry, artificial intelligence is widely used in trend forecasting, supply chains, and fashion design, with 73% of executives stating that AI will be an essential part of their business. Although AI is increasingly integrated into creative processes, limited research explores how consumers perceive AI-designed fashion products. Companies must carefully examine consumer perceptions, given concerns about ethics, creativity, and job displacement. Overreliance on AI in design may harm brand perception, while avoiding AI could limit innovation and profitability. Therefore, the purpose of this study is to understand how AI-designed fashion products influence consumer perceptions. Specifically, content analysis and a structured survey will assess consumers' ethical and creativity concerns, attitudes, and purchase intentions toward AI-generated design. Results and implications will be discussed at symposium.

Catherine MacGregor, Senior, Fashion Design

Mentor: Ja Young Hwang

Add to Cart

My collection “Add to Cart” is a playful take on the fashion industry’s overconsumption problem. It asks the question: In a world dominated by fast fashion, how can the average consumer challenge overconsumption by redefining their personal shopping habits? From dresses draped in button downs to patchwork denim and dead stock fabrics, this sustainable collection is meant to inspire action and spark conversation around this debilitating issue. Each look exaggerates the act of owning too much, like if someone put on every shirt in their closet. Or the denim jacket set, which is patterned to mimic several layered skirts, belts included. Through up cycled and secondhand materials, the collection confronts viewers with the potentially uncomfortable reality of their own wardrobes and the environmental cost tied to unchecked consumption.

Michael Moore, Junior, Fashion Design

Mentor: Joanne Arnett

Engineering the Silhouette: Couture Techniques in Embellishment, Corsetry, and Garment Architecture.

Fashion design is a craft that combines both technique and art. This study poses the question; how far can the two concepts be pushed simultaneously. The goal is to create a garment that considers both artistic integrity, and technical mastery, to alter the human form while remaining functional as a wearable garment. Research was conducted through flat patterning, draping, prototyping, fitting, and embellishment. After creating a pattern, several prototypes were made and fit the model, structural elements were added to the fabric to create the desired shape. The embellishment techniques used were tested and adjusted as needed. The result is a garment with a highly engineered silhouette, with couture embellishment techniques applied to create something both beautiful and architectural.

Adelynn Prushing, Senior, Fashion Design

Mentor: Krissi Riewe, Archana Mehta

Knit & Nectar

Knitwear has been rising in popularity for years now. In my research, I am exploring designing an eight-look knitwear collection combining fully-fashioned knits with cut-and-sew knits using natural fiber yarns. With skin being our largest organ, it is important that the environment around our skin is breathable and natural to maintain healthy balance for our skin. The collection's knit structures, color scheme, and silhouettes are inspired by angiosperms that benefit the Earth, people, and sustainability. The fully-fashioned pieces are knitted on the CMS 520, and the ADF 3+ Stoll machines. The goals of the pieces within the collections are to be comfortable, mix and match style ability, made for all genders, that are durable, suited for everyday wear, that everyone will cherish.

Maya Saba, Senior, Fashion Design

Mentor: Ja Young Hwang

ElseWear

ElseWear explores how clothing can function as a form of communication while expressing vulnerability and resilience. The collection examines the duality of protection: the mind shields through distance, imagination, and illusion, while the body defends through physical barriers such as layers, weight, and structure. Through layered constructions, fabric manipulation, and contrasts of sheer and opaque textiles, the designs visualize this interplay between fragility and strength. The design process included sketching, pattern testing, and prototype refinement, allowing garments to evolve through experimentation and critique. Some pieces evoke the mind's intangible defenses, delicate yet powerful, while others embody the body's armor-like protection. Together, the collection transforms everyday clothing into a narrative of connection, resilience, and identity, revealing how protection manifests both mentally and physically.

Andrea Sudia, Senior, Fashion Design

Mentor: Ja Young Hwang

Diendo

As a Type One Diabetic, I struggled to find clothing that would accommodate my pump. The Diendo collection was designed around this complication, by designing looks for diabetic women, incorporating both visible and hidden pockets into each look, complete with buttonholes to allow the pump cording to pass through. Diabetic supplies inspired the colors and silhouettes due to their unique shapes that have asymmetrical aspects. The port site, glucose trend graph, and continuous glucose monitor are all sources of silhouette inspiration. Additionally, the medical equipment is in shades of bright colors, which is unexpected for the severity of the disease. Fabric selection was based on finding soft textures that would be smooth and would not cause irritation against the injection site or skin.

Lauren Turner, Senior, Fashion Design

Mentor: Ja Young Hwang, Krissi Riewe

SCTR- Showcasing Culture Through Reaffirmation

The Black Experience is a combination of joy, culture, oppression, and much more, shaped by society. SCTR, pronounced 'sector', addresses femininity in Black Women, specifically how society deems them as non-performing. Femininity is a social construct taught and practiced from adolescence, meaning that, depending on your culture and environment, it can be exemplified differently. When examining femininity, race and gender both play a significant role in how it's viewed. Intersectionality is the basis of this thesis and how both oppressed groups, race and gender, affect the portrayal of femininity in society. Black Women are feminine in ways society perceives as masculine due to stereotypical views instilled in them by the media. This collection combines feminine and masculine elements, including different silhouettes, fabrics, and methodologies.

Julian Weber, Senior, Fashion Design

Mentor: Krissi Riewe

Expiration Date

This fashion collection seeks to illustrate how visual embraces of natural degradation processes can create clothing that is more sustainable, while also creating intrigue through displaying passage of time. Depicted through themes of tailored menswear, these looks juxtapose the formal and well defined with the messy and abstracted. This fashion collection is accompanied by bone screenprints and accessories made from scavenged bone and shell materials, which depict an unrelenting embrace of natural decay. All fabrics in this collection are dyed naturally, with most of the dye matter foraged from local trees. Additionally, all paint is made completely from bones and natural oils, as well as button closures carved from mussel shells, creating a fully biodegradable fashion line that embraces decay both in function and aesthetic.

Ash Welch, Senior, Fashion Design

Mentor: Ja Young Hwang

Northern Line

‘Northern Line’ men's outerwear collection investigates how menswear can respond to the shifting climate and lifestyle demands of city-goers while drawing from the visual imagery that surrounds them. Using London as a primary reference point, the research focused on documenting weather and observing movement patterns of a day-to-day life in the city. Graffiti culture served as a key visual language, informing garment construction and surface graphics. Through flexible construction designs, the collection allows wearers to modify garments in response to temperature, rain, and activity. Textile experimentation like quilting as line work, self-fabric appliqué, cut-out stitching, and rhinestoned prints, translated street imagery into tactile form. The final collection presents winter streetwear that balances function, identity, and environment, demonstrating how clothing can act as both protection and expression within an ever-changing city landscape.

Alyssa Wilson, Senior, Fashion Design

Mentor: Krissi Riewe

Wake Up

This collection investigates anxiety in young women and its connection to maladaptive daydreaming as a coping mechanism. Through research-driven design, the work explores the psychological experience of retreating into vivid daydreams and the struggle to regain consciousness and control. The collection serves women who are emotionally driven yet challenged in articulating their needs, using clothing as both protection and expression. Structured wool suiting symbolizes emotional walls and self-imposed barriers, while sheer, fluid georgette represents escape, vulnerability, and the dream state. Fabric manipulation techniques, including the designer's original "snowflake method," visually communicate the act of breaking through metaphorical walls. Together, the garments narrate a progression from concealment to openness, reflecting the process of building confidence while navigating anxiety.

Skye Yuzik, Sophomore, Fashion Design

Mentor: Laura McAndrews

Constructing Gender in Early Childhood

Children's apparel functions as an early site of gender socialization, communication expectations about identity, behavior, and bodily presentation. This study examined how contemporary toddler graphic T-shirts reinforce gender norms through color, imagery, typography, and silhouette. A comparative content analysis was conducted on 110 garments from two major U.S. retailers, Carter's and Old Navy across boys', girls' and unisex categories. Findings show continued reliance on pink and purple for girls and blue for boys. Girls' designs more frequently featured relational and nature-based themes with cursive typology, while boys' emphasized vehicles, exploration, and bold lettering. Despite minimal biological differences in toddler body shape, girls' shirts often included curved seams and wider necklines. These results highlight how design subtly reproduces gendered expectations in early childhood.

Fashion Merchandising

Natalya Carroll, Senior, Fashion Merchandising

Mentor: Xingqiu Lou

Do Sustainable Fibers Win? What Really Drives Apparel Preferences

This study explores consumers' fiber preferences and examine the factors that influence these choices. Following an initial review of existing literature on fiber selection, the study used a mixed-method approach, including an in-depth content analysis of customer reviews for cotton and polyester apparel as well as an online survey. The combined analyses revealed several notable findings. Consumers tend to make purchasing decisions and form positive evaluations of apparel based on physical attributes such as comfort and fit. In addition, their existing knowledge of sustainability and their broader pro-environmental behaviors play an important role in shaping fiber preferences. Although overall consumer knowledge about sustainability remains limited, the findings suggest that many consumers are making relatively responsible choices based on the information currently available to them.

McKenna Childs, Senior, Fashion Merchandising

Mentor: Narmin Nasibli

"Content and Sentiment Analysis of Digital Product Passports Application in the Fashion Industry Supply Chain"

With the rise in environmental concerns, companies are looking toward new technologies to help enhance traceability and transparency within the supply chain. One upcoming solution that is starting to be integrated is blockchain technology in the form of Digital Product Passports (DPP), which is a digital record that provides comprehensive information about a product and its entire value chain. This includes everything from the origin of the product, materials used, environmental impact, and disposal recommendations. The proposed research idea consists of conducting a simultaneous content and sentiment analysis of two questions: "What is the public sentiment regarding the potential integration of Digital Product Passports?" and "How frequently do Digital Product Passports come up in reference to Fashion supply chain traceability?"

Sarah Faour, Senior, Fashion Merchandising

Mentor: Xingqiu Lou

The Sustainability Paradox in Fashion: Awareness Without Action

This research examines how sustainability initiatives influence consumers and whether such initiatives affect purchase decisions. A content analysis and a survey were conducted. For the content analysis, 24 customer comments and reviews related to brand or product sustainability were examined. The survey consisted of questions related to consumers' purchasing habits, attitudes, and perceptions related to fashion sustainability. The findings indicate that while consumers have a general awareness of fashion sustainability, this knowledge does not appear to exert a substantial influence on their purchase decisions. The results also indicate a degree of skepticism and mistrust toward brands' sustainability claims. At the same time, consumers respond well to responsibly sourced fiber content, such as 100% and organic cotton. Overall, these results suggest that there is general interest in fashion sustainability and brand responsibility and highlight the importance for marketers and brands to communicate sustainability initiatives more clearly, credibly, and transparently.

Jordan Meadows, Senior, Fashion Merchandising; Olivia Lichi, Senior, Fashion Merchandising; Isabella Bohlen, Senior, Fashion Merchandising

Mentor: Narmin Nasibli

Consumer Perception of AI-Generated Designs

As artificial intelligence (AI) becomes increasingly integrated into the fashion design process, consumer perceptions of AI-generated versus human-made designs remain under-researched, particularly across age demographics. This study will examine how consumers perceive the quality, authenticity, and value of AI-generated garment designs and their ability to distinguish them from human-designed garments. Using a mixed-methods approach, our research will combine a survey-based observational study with content analysis. Participants from a broad age range will evaluate comparable AI-generated and human-made designs and attempt to identify their origin. Findings aim to reveal generational differences in AI familiarity, discernment, and purchase willingness, offering insight into how fashion brands can strategically and ethically integrate AI into design processes.

Mariana Quinones Gaucin, Senior, Fashion Merchandising

Mentor: Narmin Nasibli

The Effects of Virtual Runways on Consumer Loyalty & Brand Image

This study explores how virtual fashion shows influence long-term consumer loyalty and brand image in the digital fashion era. As brands invest heavily in immersive online runways, questions remain about whether these experiences create lasting emotional connections or simply generate short-term attention. While virtual formats often increase engagement and purchase confidence, limited research examines their sustained impact on brand trust, authenticity, and moral alignment. Using social media sentiment analysis and consumer surveys, this research evaluates how virtual runways shape perceptions of brand identity over time. The findings aim to determine whether digital innovation strengthens the longevity of loyalty, providing strategic insight for fashion brands seeking to balance technological advancement with authentic, long-term consumer relationships.

Geology / Geography / Horticulture

Finn Machuga, Sophomore, Environmental Studies

Mentor: Sarah Smiley

Water Intermittency in Kigali, Rwanda

To expand water security knowledge, researchers have developed the HWISE (Household Water InSecurity Experiences) Scale which includes metrics to measure severity, adaptation, and resilience. This project aims to expand the definition of water security by utilizing HWISE Scale within a case study of water usage in Kigali, Rwanda. 110 surveys were conducted which asked community members about water sources and storage, frequency and severity of interruptions, and levels of worry about the interruptions. Interesting patterns emerged from these field surveys as water security seems to vary greatly between neighbors. Specifically, some of the interviewees have access to tanks that hold up to 10,000 l of water and fill up automatically while some interviewees manually fill up and store a handful of jerry cans.

Jackson Miller, Junior, Environmental Studies

Mentors: He Yin, Elaine Hsiao

Two-Eyed Seeing: A Remote Sensing Approach to Monitoring Wildfires on Indigenous-Owned Lands

Wildfires across the Western United States have shown their destructive capabilities and are expected to get worse with Climate Change. This study will identify areas that implement Indigenous land management practices and quantify their ability to limit wildfire destruction and spread. This study looked at an Indigenous-owned land in California purchased by the Mountain Maidu people in 2019. The land has been managed by cultural burns, restoration of natural stream hydrology, and beaver reintroduction. In 2021, the Dixie Wildfire burned through this region, allowing for a comparison of this land to a nearby timber preserve with regard to burn area and severity using burn indices such as dNBR and land cover classifications. Calculations found that burn severity was higher on the timber preserve.

Jaynie Pulaski, Senior, Geology; Nitin Paliwal, PhD Student, Geology

Mentor: Kuldeep Singh

From Roughness to Order: The Evolution of Spatial Heterogeneity in Calcite Dissolution

This study investigates how the spatial and temporal dissolution patterns that form on the surface of calcite compare to bulk dissolution rates. A confocal microscope was used to image the same location on a freshly cleaved calcite surface under flow conditions at various times. A flow reactor pumped a constant stream of pH 5 acetate buffer. This allowed for three-dimensional mapping of surface with micrometer-scale resolution. Local dissolution rates were measured across the surface to produce spatial dissolution rate maps and statistical rate spectra. The results reveal significant spatial heterogeneity in dissolution rates, with dissolution predominantly occurring at etch pits and step edges. Overtime, the etch pits deepen and merge, leading to a change in surface roughness and resulting in changes to the overall rate.

Andrew Shenal, Senior, Environmental Studies

Mentor: Patrick Bitterman

From Barns to Bay: Mapping Animal Feeding Operation Manure Risks in the Chesapeake Bay Watershed Using Geospatial AI

Agricultural manure is estimated to contribute 19% of nitrogen and 26% of phosphorus loads influencing Chesapeake Bay. Existing documentation often lacks the location of the animal feeding operations [AFOs] that store and produce this manure across the region, despite their locations providing significant benefit to watershed management through nutrient planning and risk assessment. This study utilizes Meta's Segment Anything Model and high-resolution aerial imagery to identify AFOs in the Chesapeake Bay Watershed, providing a comprehensive database of their locations. Further, with high-resolution land cover data in the watershed, liquid manure storage locations can be interpolated and documented. Results reveal a significant portion of AFOs create risk of watershed contamination due to presence of manure and waterway connectedness. Additionally, we identify the amount of AFOs not documented across each state amplifying the importance of increased transparency and data reporting.

Bryce Stoltz, Senior, Geology

Mentors: Courtney Wagner, David Singer

Characterizing Magnetotactic Bacteria from Acid Mine Drainage Sites in Northeast Ohio

Preliminary work from acid mine drainage sites in Northeast Ohio confirm that magnetotactic bacteria (MTB) are present in these ancient Earth- and Mars-like environments. The OATZ is found in chemically stratified water columns and is typically located within the first centimeter or so of the water-sediment interface. MTB biomineralize magnetic crystals, which aid in navigating the water column. The crystals are characterized by different size, morphology, and composition, which can indicate different species with distinct environmental preferences. The magnetic crystals can also be preserved after cell death, recording past environmental conditions and how they have changed over time. Studying modern analog environments strengthens interpretations of past environments. This research advances our understanding of the environments MTB can inhabit and how this information can be used to study life on early Earth and Mars.

Georgia Wood, Senior, Horticulture

Mentor: Sheren Farag

Which Coffee Type Improves Plant Growth the Best?

Over the course of 8 weeks, I tested four different types of coffee to see if there were differences in growth. I used 3 different plant species, basil, marigolds, and cayenne peppers. Five of each plant were grown with one of those plants receiving no coffee at all to stand as a baseline for normal plant growth. All plants received water daily starting at $\frac{1}{2}$ cup and ending at 2 cups with water amounts increasing in $\frac{1}{2}$ cup increments. Four of each plant received their assigned coffee type every other day starting at 1 tsp and ending at 3 tsp with coffee amounts increasing in 1 tsp increments. At the end of the 8 weeks, all plants were measured in weight, width, and height.

Physics

Mila Spike, Senior, Physics (Chemistry)

Mentor: Veronica Dexheimer

Modeling Quark Stars using MUSES, an Equation of State Solver

Neutron stars are highly dense, celestial objects speculated to be made of quark matter, giving rise to what are called quark stars. In this study, MUSES is utilized to model these quark stars which can be used to understand their interior. Several requirements must be met by the model, such as modeling a star of 2 solar masses. Here, the model was altered by varying the strength of repulsive and attractive forces, within observable stars. Upon making these variations, it was observed that increasing the strength of repulsive forces led to the production of more massive stars and thus producing 2 solar masses. Overall, by increasing the accuracy of quark star models, scientists could be able to accurately depict their interiors.

Pranav Srinivasan, Junior, Physics

Mentor: Thorsten Schmidt

DNA Based Barrel Support Structures for Membrane Protein Imaging

Membrane proteins are challenging to study due to their hydrophobicity and instability in non-native environments, despite their crucial roles in cell communication, structure, and transport. This project explores using DNA nanostructures to facilitate their study. A long single-stranded DNA is folded into a barrel-like structure with shorter strands, which with certain modifications can suspend nanodiscs containing a lipid bilayer—the native environment for membrane proteins. The protein is housed within this bilayer, and the system can be frozen in various orientations for imaging. These images are analyzed to reconstruct a 3D structure of the protein. The structure as well as one orientation of the nanodisc within it has been optimized, and work continues to stabilize these structures in Cryo-electron microscopy conditions, as well as optimizing other orientations of the nanodiscs within them.

Hannah Zelina, Junior, Physics (Biological Sciences)

Mentor: Hamza Balci

Fluorescence Polarization Anisotropy: Quantifying DNA-Protein Interactions

Binding interactions between DNA and proteins are essential to the proper functioning of living organisms and so improving our understanding of these interactions has significant implications for both medical and biophysical research. Fluorescence Polarization Anisotropy is a technique based on the principle that a large complex has less rotational mobility than a smaller molecule. Fast rotation causes the light emitted from the fluorescently labeled DNA to become depolarized. Slow rotation allows for much more of the original polarization to be retained. The amount of this polarized light when measured from a sample is then proportional to the fraction of bound molecules. This technique is very practical for drug screening and discovery, immunoassays, and monitoring enzyme activity.

Political Science / Philosophy / History

Marissa Lane Anderson, Freshman, Accounting; Camille Rose Clark, Aerospace Engineering; Valen Earles, Freshman, History; Brooklyn Heller-Correa, Freshman, Public Health (Pre-Medicine, Dentistry, Osteopathy)

Mentor: Sarah Sisson

Campus to Clouds: Shuttle Buses to Ohio Airports

Campus to Clouds is a transportation system that will be taking Kent State students to surrounding airports from the Kent State Main Campus. International students who wish to experience American culture can use this system to travel during breaks and holidays, along with students who do not have cars on campus or a ride to the airport. Our research shows that other colleges in the area have a direct transportation bus from their campuses to airports. To further this research we will interview Kent State office administrators to gain their insight, along with sending out surveys to Kent State students. Our goal is to lessen the transportation disparity at Kent State and provide all Kent State students with the opportunity to travel home and abroad.

Gaby Bates, Freshman, Chemistry; Nathan Murray, Freshman, Business Management; Kyle Cavendish, Freshman, Biotechnology; Alana Stewart, Freshman, Exploratory

Mentor: Madison Slagle

Charge It Up: Communal Charging Across Campus

“Charge It Up” is our project aimed at taking charge and providing communal charging stations around campus. Specific charging stations would be placed in certain locations such as mini USB calculator chargers in the math and science buildings, and USB-C chargers in high traffic areas such as the Design Innovation Hub and the Student Center—which is where students come to campus for the first time and have no available charging stations that are accessible. The consistent inconvenience of no chargers at bus stops has left many without any access to the bus schedule—another problem our project aims to relieve. As a part of the project, student surveys will be taken across campus to gain more information and beliefs on the topic of chargers around campus.

Emily DeLoach, Senior, Fashion Merchandising

Mentors: Madyson Hendrick, Craig Berger, Sonia Karkare

Monthly Kent Community Clothing Swaps: A Formal Proposal

The overconsumption of mass-produced fashion is rampant around the world, and society isn't aware of the environmental implications this has. This proposal addresses this problem through monthly clothing swaps to cultivate a tradition that increases awareness, helps students and faculty connect, and improve the environmental, cultural, and social sustainability of Kent, Ohio. This initiative is backed by interviews/meetings conducted with people and organizations (i.e. Office of Sustainability, Portage County Clothing Center, environmental scholars, professors at the School of Fashion), quantitative data that proves that clothing swaps uphold sustainability, and a written technical proposal. The expected outcomes of this initiative are increased community engagement, volunteer opportunities, a more educated community, a group of environmentalists that will continue this initiative, and free clothing for the community.

Alice Fox, Junior, History

Mentor: Lindsey Starkey

Mysticism, Marriage, and Sexuality: A study of Medieval Holy Women in Norwich

This past summer, I researched the sexualities of two notable Medieval English holy women, Margery Kempe and Julian of Norwich. My purpose with this research was twofold; one, to better understand to what extent their sexualities shaped their lives, experiences, contemporary images, and legacies; and two, to better understand to what extent their devotion to and relationship with God influenced these sexualities. By reading written accounts from both women as well as a variety of secondary sources on the time, place, and society in which they lived, I have concluded that both of these women led lives almost entirely marked by their sexual and committed relationship with God, marking them as early examples of deviation from normal sexual behavior that defined their identities and lives.

Lorelai Lowe, Freshman, Human Development and Family Studies (Case Management for Individuals and Families); Anthony Baioni, Freshman, Digital Media Productions; Addison John, Freshman, Business Management; Quinn Varian, Freshman, Aerospace Engineering
Mentor: Isabella Buell

Preserve to Serve: Providing Adequate Nutrients for Kent State

In 2025, the CARES center addressed a need to provide higher-quality food for Kent State University (KSU). In 2023, the pantry served 2,046 people, 60% KSU Students, 20% faculty/staff, and 20% community members. Many low-income students struggle to afford basic needs such as housing and nutritious food. To address this issue, we propose investing in a chest freezer for the CARES center to store meats, breads, and other perishable items that can remain fresh longer. This addition would improve students access to healthier and more nutritious food options. We plan to collaborate with local grocery stores, to request food donations to help keep the freezer stocked. Our goal is to ensure consistent access to high-quality food and reduce food insecurity on campus.

Lucy Macejko, Sophomore, Integrated Social Studies (Political Science)

Mentor: Julie Mazzei

Strong Warriors or Defenseless Victims: How Women are Conceptualized in Studies of Political Violence in Academic Articles

Women have been misconceptualized within research, being viewed as victims rather than autonomous beings who can also participate in violence. There has been a limited amount of research conducted on bias within the academic community involving women's agency in enacting violence. With this study, we can examine how biased and limited the field has been when observing political violence. We took articles from the two journals: Terrorism & Political Violence and Dynamics of Asymmetrical Conflict, and did a meta-analysis of the articles involving women. We can see there is a significant amount of misconceptions about women's participation in political violence.

Aryan Majhi, Sophomore, Aerospace Engineering

Mentor: Lauren Vogel

How Ohio's Senate Bill 1 Fuels Ethnocentrism

This project analyzes Ohio's Senate Bill 1 and its impact on higher education, academic freedom, and student inclusion. The legislation restricts diversity, equity, and inclusion initiatives, limits classroom discussion of controversial topics, and imposes new structural requirements on public universities. Through analysis of legislative text, public testimony, and media coverage, this research explores how the bill disproportionately affects marginalized communities and reshapes the academic environment. The study also examines how the absence of a clear definition of DEI enables broad enforcement that may discourage open inquiry. Conducted as part of Kent State's Summer Undergraduate Research Experience, this project highlights the broader implications of education policy on intellectual diversity and institutional autonomy.

Laure Milem, Freshman, Speech Pathology and Audiology; Dylan Miller, Freshman, Psychology; Liam McDonough, Freshman, Exercise Science (Exercise Physiology); Kaitlyn Koscho, Freshman, Public Relations

Mentor: Brittany Lucia

FlashMart 24/7

FlashMart 24/7 addresses the lack of late-night dining options across residential halls on campus. Many students with late-night classes or busy schedules are unable to find food after dining halls close. FlashMart 24/7 proposes always open mini markets placed in residential areas such as the Quad and Front Campus. During work hours, student employees will supervise the market, and after hours, students are allowed to come and go using cashless payments. FlashMart 24/7 will provide affordable pre-packaged snacks and drinks, so students stay fueled all day. We will share links to surveys and interview the Culinary, Flash Office, and Housing departments. Working with local suppliers with help keep products stocked regularly. Overall, FlashMart 24/7 aims to improve food resources across campus.

Psychology

Adeline Albert, Sophomore, Psychology

Mentor: Christopher Was

Test Taking Strategies are Better Predictors of Exam Scores than Self-Efficacy

The primary objective of the investigation was to determine whether test-taking strategies were more important to test scores than self-efficacy. Three hundred and eighty-four undergraduates participated for course credit. At the beginning of the semester, students were administered several individual-difference measures. Measures included the Learning and Study Strategies inventory (LASSI: test-taking strategies) and the MSLQ (self-efficacy for learning), and other measures related to individual differences hypothesized to be related to undergraduate academic success. Results suggest that test-taking strategies account for unique variance in academic success with the total exam scores that self-efficacy does not. While self-efficacy can be a great motivator for students during a test, on its own, it isn't enough. Applicable and practical strategies add value and are more meaningful during a test.

Joshua Alfman, Senior, Psychology

Mentors: Douglas Delahanty, Lindsay Kutash

Is Pain-Related Fear Simply Fear? Examining Discriminant Validity of Pain-Related Fear from General Negative Affect in Sample of Pain-Free Adults.

Pain-related fear (PRF) is central to fear-avoidance models of chronic pain, yet its distinction from general affective vulnerabilities remain unclear. The current study examined whether PRF is a unique construct or reflects shared general distress/threat variance. Healthy, pain-free adults completed Fear of Pain Questionnaire, Adult Temperament Questionnaire, Anxiety Sensitivity Index, Pain Anxiety Symptom Questionnaire (PASS-20) and VAS assessing state fear of exercise prior to a hamstring resistance exercise designed to induce muscle soreness. Correlational analyses revealed that PRF was weakly related to trait negative affect domains (NA; fear, frustration, sadness, sensory discomfort). The medical/dental PRF subscale was associated with anxiety sensitivity and NA-fear. PRF predicted conditioned anticipatory fear of exercising while sore, but not unconditioned fear, and all PASS-20 domains. Findings support discriminant validity of PRF within pain-specific threat processes and clarify its role in models of chronic pain risk and maintenance.

Annie Anselmo, Junior, Psychology (Child Psychology)

Mentor: Karin Coifman

BMI is Negatively and Independently Associated with GPA in Undergraduates

Elevated body mass index (BMI) has been associated with poor health and well-being outcomes in past work. The current study shows that college BMI is also independently related to both high school and college grade point average. If replicated, these findings encourage programs promoting healthy weight to optimize academic performance.

Maia Baliner, Senior, Psychology

Mentor: William Lechner, Angela Zaur

Adverse Childhood Experiences and Stress Reactivity in Daily Smokers

Adverse childhood experiences (ACEs) are associated with increased risk for substance use and may influence addiction vulnerability through altered stress-related emotional processes. This study examined whether ACE exposure was associated with stress reactivity in daily cigarette smokers within the Addiction Neuroclinical Assessment (ANA) framework. Fifty-six adult smokers completed a Trier Social Stress Test with repeated assessments of negative affect and urge to smoke across four timepoints. Negative affect and urge increased significantly across the stress protocol, and higher ACE exposure predicted greater overall negative affect. However, ACE exposure did not significantly moderate changes across stress phases. Findings suggest early-life adversity is linked to persistently elevated emotional distress during acute stress, which may contribute to smoking vulnerability through stress-related increases in craving.

**Madison Bernard, Junior, Psychology; Brennan Kelly, Graduate Student, Psychology;
Leonard J. Simms, PI, Psychology**

Mentor: Trevor Williams

Examining Symptom Specificity in Borderline Personality Disorders Link to Mistrust

Borderline personality disorder (BPD) is characterized by instability of mood, self-image, and behavior, these symptoms often having a significant impact on social relationships. Mistrust tends to be an important source of this social dysfunction, which previous research has shown is related to BPD. However, no previous research has examined associations between specific BPD symptoms and mistrust. The aim of the current study is to examine what symptoms of BPD are associated with mistrust. Participants (n=407) were recruited through an undergraduate psychology participant pool, consisting of moderate and high BPD features. There were significant positive correlations between all BPD symptoms and mistrust (all p values <.01), but variation across symptoms in the magnitude of these correlations. Such findings highlight the importance of mistrust for understanding BPD and its unique symptoms profiles.

Emily Bishop, Psychology

Mentor: Phillip Hamrick

Assessing Levels of Mental Health Professional Trust and Other Moderators

Studies have illustrated that those with negative perceptions of non-native accented speakers rate those speakers as lower on evaluations of comprehensibility, intelligibility, trustworthiness, and other social measures. The current study aims to investigate if non-native accented speech predicts ratings of mental health professional trust with a focus on political ideology as a potential moderator. It is anticipated that a relationship will be seen between non-native accented speech and lower ratings on social measures. It is also expected that political ideology will moderate this relationship. Once finalized, the findings from this research can serve to further inform social responses to speech, specifically focused on non-native accented speech and mental health professionals.

Maryam Bonchu, Senior, Psychology; Rielly Fabrizio, Junior, Psychology

Mentor: Brittany Baugher

Daily Behaviors Predicting Changes in Mental Health Across the Semester

As college students transition into adulthood, behavioral patterns develop that may persist across their lifespan. The current study examines how daily behaviors predict changes in psychological symptoms and well-being across an academic semester. Participants (N = 324) completed self-report questionnaires at the beginning and end of the semester reporting depression, anxiety, loneliness, somatic symptoms, and life satisfaction. Participants also completed a 7-day ecological momentary assessment (EMA), reporting five times per day on engagement in adaptive and maladaptive behaviors. Regression analyses examine engagement in these behaviors as predictors of changes in psychological symptoms and wellbeing across the semester. Findings will clarify how everyday behaviors contribute to mental health changes during a critical developmental period of life.

Renie Booth, Sophomore, Psychology (Pre-Medicine/Pre-Osteopathy); Angela Jones, Psychology

Mentor: Jocelyn Folk

Letter Persistence Effects in Acquired Dysgraphia and Slips of the Pen

Letter-persistence effects have been reported in patients with acquired dysgraphia (Fischer-Baum & Rapp, 2014; Fischer et al., 2010; McCloskey et al, 2006). Letter persistence errors occur when letters from prior spelling responses are intruding on future responses with a rate greater than chance. These effects found in patients with acquired dysgraphia have been used to argue that, within the spelling system, activation from the letter level can feedback to the word level. In the current study, spelling errors from a patient with acquired dysgraphia and from a college sample with intact spelling systems were analyzed for letter-persistence errors. The study is intended to replicate previous work and to expand the findings to intact spelling systems, with discussion of implications for models of spelling production.

Joshua Brady, Senior, Psychology

Mentor: Christopher Was

Comparing Self-Efficacy to Study Time in Predicting of Academic Performance

The current study was conducted to examine whether self-efficacy for learning is more important than study time (in number of hours) in terms of academic success. Three hundred and eighty-four undergraduates enrolled in an Educational Psychology course participated for course credit. At the beginning of the semester in which participants were enrolled in the course, they were administered several individual difference measures. The measures included the Learning and Study Strategies inventory (LASSI), Elliot's (1999) measure of achievement goal orientation, and other measures related to individual differences hypothesized to be related to undergraduate academic success. Our study found that student self-efficacy was more strongly predictive of academic performance than study time measured in hours, affirming the power of self-efficacy to strengthen learning and subsequent academic achievement.

Kay Budrovic, Senior, Psychology (Child Psychology)

Mentor: Phillip Hamrick

Changes in Language Production Observed in Alzheimer's Clinical Syndrome

Alzheimer's Disease (AD) is a neurodegenerative disorder that impairs memory, language, and other cognitive functions. Research suggests that cognitive declines in AD may be precipitated by changes in speech, which are partly predicted by the Dual-Process Model (DPM). This model predicts that aspects of speech, such as formulaic and novel language, will vary in frequency. In early AD formulaic language would be more prevalent than novel. Spontaneous speech of 81 individuals with probable Alzheimer's Clinical Syndrome (ACS) and 61 healthy controls were analyzed. As expected, individuals with ACS produced more formulaic speech and less novel speech in comparison to the control group. The differences that were found were consistent with the DPM. These findings may have clinical implications and cause for further research.

Emilie Carlile, Junior, Psychology

Mentor: Rachael Blasiman

Symptoms of ADHD and its Effects on Our Lives

My research aims to understand attention deficit hyperactivity disorder (i.e., ADHD) and whether there is a relationship between ADHD, self-image, general hygiene, productivity & self-esteem. My research is an applied quasi-experimental study consisting of 88 questions designed to assess participants' self-image, general hygiene, work productivity, and self-esteem. The current total number of participants is 307. I aim to compare age and gender between people diagnosed with ADHD and people who are not diagnosed with ADHD. Some limitations of my study include the effects of the experimental design and instrumentation (e.g., participants may become bored mid-survey and provide a random response to finish). The future of my research is to answer the 'why?' of ADHD and how it affects a person's life beyond hyperactivity and inattention.

Dominic Chifulini, Junior, Psychology; Patrick Straits, Junior, Psychology

Mentors: Brandon Boring, Karin Coifman, John Gunstad

Lack of Perceived Social Support is Associated with Greater Pain Sensitivity

Perceived social support consistently predicts pain-related outcomes, but its relationship with underlying pain physiology has not been fully studied. Using data from an ongoing longitudinal project, the results showed that lower reported perceived social support was associated with greater pain sensitization as assessed by mechanical temporal summation.

Payton Courtney, Senior, Psychology; Anna Derry, Junior, Psychology (Child Psychology); Abby Prusha, Senior, Psychology; Grace Stidham, Junior, Psychology

Mentors: Phillip Hamrick, Katelyn McClure

Why “Kiss” is Easier to Understand Than “Kill”: Sound Similarity and Frequency Effects in Spoken Word Recognition

How do people recognize speech in real time, and what makes recognizing speech easier or more difficult? Words that have many similar-sounding words (phonological neighbors) and how often the word is spoken (word frequency) creates competition while listening to speech. Previous research suggests that both factors interact to dynamically impact word recognition. While high-frequency words are recognized faster in general, the effect is larger for words that do not sound similar to other words. However, this previous research was limited. We address these limitations by including a larger sample size, more up-to-date analyses, and a wider range of stimuli. We anticipate that our results will extend previous research and strengthen previous conclusions that phonological neighborhood and word frequency dynamically interact during spoken word recognition.

Kayla Dixon, Senior, Psychology; Katelyn Brown, Senior, Nursing; Elizabeth Gampolo, Senior, Psychology

Mentor: Megan Korhummel, John Gunstad, Karin Coifman

When Feelings Get Involved: Self-Conscious Emotions and Risk-Related Avoidance

While prior research suggests that negative self-conscious emotions (NSCEs) including shame, are associated with social withdrawal and risk-taking behaviors, the role of NSCEs and positive SCEs (PSCEs) in everyday avoidance remains underexplored. This study investigated how self-conscious emotions drive risk-related avoidance. Using the Kent State Student Life Study, undergraduates completed a 7-day experience sampling protocol. Using a lagged model framework (i.e., SCEs at signal t predicting behaviors at $t+1$) we found mean PSCEs were associated with decreased general avoidance, and NSCEs were associated with increased social and general avoidance. Greater momentary fluctuations in NSCEs were associated with decreased social avoidance. Findings suggest that PSCEs may buffer against maladaptive behavioral patterns and provide a greater understanding of how SCEs may drive decision-making.

William Doering, Sophomore, Psychology; Tanushree Ujjineni, Junior, Neuroscience; Amelia Pecic, Senior, Psychology; Jillian Thomas, Other, Psychology

Mentors: Kayla Scamaldo, John Gunstad, Karin Coifman

When Asked About Stress, Does the Nervous System Respond?

Research shows stress negatively impacts mental and physical health, yet how these stress-related autonomic processes unfold ecologically is unclear. The present study aims to examine how reported stress influences subsequent nightly sleep and next-morning autonomic activity in an ecological context. Using a 7-day ecological momentary assessment protocol, participants (N=330) from Kent State completed 5 daily stress surveys while wearing a Garmin Vivosmart 4 device which measured their autonomic activity and sleep. Mixed-effects analysis will be utilized to determine how day-level stress impacts reports of prior nightly sleep and next morning autonomic activity, while controlling for relevant covariates such as age, sex, and BMI. We hypothesize that greater day-level interpersonal stress will predict aroused sleep and greater morning autonomic activity.

Isabella Evans, Sophomore, Psychology; Campbell Klingensmith, Junior, Psychology (Counseling Careers)

Mentor: Christopher Was

Exploring the Relationship Between Defensive Pessimism and Self-Handicapping to Metacognitive Ability

The current study was designed to determine whether defensive pessimism and self-handicapping are related to poor metacognitive ability in undergraduate students. Sixty-five undergraduates enrolled in an Educational Psychology course participated for course credit. Students were administered 13 exams and asked to predict their scores before taking the exam; predict the score they believe they received after completing the exam, but before seeing their score (post diction); as well as predict their next exam score, after receiving the current exam score. Students who scored highly on the defensive pessimism and self-handicapping measures were also inaccurate in their test score predictions, post dictions, and predictions of their next exam score. Findings indicated that students who struggle with metacognition tend to self-handicap.

Matt Fellows, Junior, Psychology

Mentor: Nikki Bennett, Mary Beth Spitznagel

A Qualitative Analysis of Caregiver Burden in Owners of Chronically Ill Cats

Accumulating research shows that caregivers of chronically ill companion animals experience negative psychological effects, with increased emotional distress, depression, and reduced quality of life. This qualitative study focuses on the experiences of those who are taking care of a cat diagnosed with cancer, chronic kidney disease, or osteoarthritis. We conducted interviews with ten cat caregivers, in which participants were asked to reflect on their caregiving experiences. Thematic analysis was performed to examine how caregivers made meaning of the caregiving demands and progression of their cat's health condition. Participants described a strong sense of responsibility and meaning-making tied to caregiving, accompanied by feelings of limited control and disruptions to daily routines and living environments. Findings indicate that caregiving for a chronically ill cat is associated with emotional and practical challenges. This underscores the need for improved psychological assessment tools and support systems that acknowledge the complexity of companion animal caregiving.

Emily Grassa, Senior, Psychology (Counseling Careers); Adam Teeter, Senior, Psychology

Mentor: Christopher Was

Self-efficacy Accounts for Unique Variance in Academic Success After Controlling for Intrinsic and Extrinsic Motivation

The current study was designed to determine if self-efficacy for learning is a more important predictor of academic success (as measured by course total score) after controlling for intrinsic and extrinsic motivation. Undergraduates enrolled in an Educational Psychology course participated for course credit. Participants enrolled in the course were administered several individual difference measures. We measured intrinsic motivation, extrinsic motivation, and self-efficacy for learning as part of the MSLQ. The results suggest that self-efficacy is a more important predictor of academic success than the type of motivation. This indicates that a student's self-perception of their academic ability is related to actual performance. Comparing the two motivations, intrinsic motivation was associated with a better total score than extrinsic motivation.

Autumn Griffith, Sophomore, Psychology

Mentor: Douglas Delahanty

Beyond “Yes” and “No”: Trauma History Characteristics as Unique Predictors of Maternal PTSD and Depression After Child’s Traumatic Injury

The stress sensitization theory posits that trauma history increases risk for psychopathology following subsequent acute stressors. However, it is unclear what specific qualities of prior trauma confer risk beyond exposure alone. The present study examines how characteristics of trauma history, including trauma type, frequency, timing, perceived life threat, physical injury, and acute distress, predict psychological outcomes in mothers after a child’s traumatic injury. Participants completed a modified Trauma History Questionnaire at baseline, and PTSD and depressive symptoms at baseline and 6-months post-injury. Regression analyses controlled for income, distress related to child’s injury, injury sustained in same event as child, and baseline symptoms. Mugging and MVC history predicted PTSD symptoms, whereas history of physical injury predicted depression in this context. Regarding trauma qualities, greater severity of injury sustained in prior trauma predicted PTSD while cumulative trauma predicted depressive.

Allison Hlad, Senior, Psychology; Madeleine Nolte, Graduate, Psychology; Masiella Grob, Junior, Psychology

Mentors: Eleanor Siegle, John Gunstad, Karin Coifman

What Factors Impact Academic Success in First Generation College Students?

Past research shows that first generation college students (FGS) are at greater risk for both psychological symptoms and poor academic performance than continuing generation students (CGS). Data collected by the Student Life Study on academic performance, health history, and psychological health in FGS and CGS will be analyzed to investigate the relationship between psychological factors and poor academic performance in FGS. It is hypothesized that FGS will have lower GPA than CGS and that all psychological and sociodemographic risk factors will predict GPA.

Tori Holland-Shanafelt, Senior, Psychology

Mentor: Madelyn Rosenthal

Flight or Food: The Influence of Moralization on Body Image, Eating Behaviors, and Emotions

The role of moral emotions in shaping eating behaviors is currently understudied. Thus, the present study investigates the relationship between moral emotions, eating behaviors, and body image among college students. The study was conducted through Qualtrics, and participants were recruited from the university's psychology participant pool. Seven open-ended questions were featured in the study. A thematic analysis was performed on the final sample ($n = 68$), after the research team created a codebook and coded responses accordingly. Kohen's Kappa demonstrated adequate inter-rater reliability ($\kappa = .64$). Based on the codes, the research team developed several themes. One overarching theme is that many people report feeling guilty and ashamed about their food choices, and these feelings are connected to how they feel about their bodies.

Samantha Huchton, Senior, Psychology (Child Psychology)

Mentor: Trevor Williams

Pupillary Synchrony and Pupil Dilation in Parent-Child Dyads During Emotionally Salient Interactions

Pupillometry, the study of pupil diameter changes, is an established tool in psychology used for understanding cognitive load, affective states, and attentional focus. The current study will investigate whether pupillary synchrony emerges in social interactions in parent-child dyads and whether it is affected by positivity vs. negativity of the conversation topic. We examined the average degree of pupil dilation, variability in dilation, and dyadic synchronization of dilation, across emotionally stimulating conversations in a preliminary sample of 14 parent-child dyads, 20 dyads expected by March. Participants were instructed to engage in three, five-minute, structured conversations. Preliminary findings support data quality and indicate moderate synchrony, with planned follow-up analyses promising to advance our understanding of affective processes and interpersonal synchrony between parents and their children.

Logan Ivan, Sophomore, Psychology

Mentor: Rachael Blasiman

Color in the Margins: Why Students Use Colored Note-Taking

This longitudinal study investigates students' use of color in note-taking and the cognitive and motivational processes associated with it. Qualitative data were analyzed using human coding and AI-assisted qualitative assessment. Early findings indicate that students most frequently use color to enhance organizational structure, emphasize important information, improve memory retention, and facilitate efficient review. Quantitative analyses will examine longitudinal correlations between colored note usage and academic outcomes across time. By combining traditional qualitative methodology with AI-assisted analysis, this study contributes to emerging discussions on the reliability and scalability of incorporating artificial intelligence into longitudinal educational research.

Alayna Kasper, Freshman, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)

Mentor: Jeanne Smith

The Association of Lived Experience and Gratitude

Gratitude can fluctuate throughout life based upon chronological age and lived experience. Previous research suggest that gratitude develops through a combination of developmental maturity and lived experience, suggesting that gratitude is strongest when age and life experience interact and gratitude practices increase following a significant life event. This project considers how personal challenges and transitions influence gratitude independently of age. I plan to gather self-reported data by surveying people from different life experiences and of a variety of ages. Following the completion of my survey, I will draw conclusions based on the association between gratitude and lived experience. I hypothesize that individuals who report more impactful life experience will demonstrate higher levels of gratitude regardless of age.

Abbey Madasz, Senior, Psychology; Sally Farah, Graduate Student, Psychology

Mentor: Kathleen Casto

fNIRS-Based Neural Activity Following Negative or Positive Feedback of Self-Presentation Performance

This study used functional near-infrared spectroscopy (fNIRS) to examine prefrontal cortex activity during social evaluation. Participants received acceptance or rejection feedback while completing self-referential tasks. Results showed overall reduced neural activity after feedback, with subtle differences between conditions, suggesting task habituation influences prefrontal responses to social evaluation.

Grace Meuleman, Senior, Psychology (Counseling Careers)

Mentor: Tam Nguyen, John Gunstad, Karin Coifman

Objective–Subjective Gaps: Cannabis Effects on Working Memory and Cognition

This study examined cannabis use, working memory, and cognitive complaints among 442 college students. Cannabis users and nonusers did not differ in working memory performance ($p = .195$), but users reported significantly greater cognitive complaints ($p = .004$). Findings suggest cannabis use relates to perceived—not objective—cognitive difficulties in young adults.

Kaya Parker, Neuroscience; Vinaya Patel, Senior, Psychology

Mentor: Christopher Was

To What Extent Does Mind-Wandering Account for the Implicit Facilitation of Cognitive Procedures?

The current study examined the effect of mind wandering in implicit facilitation of cognitive operations. We conducted an experiment where a category task was designed to implicitly facilitate cognitive procedures and record instances of mind-wandering. The task included memory loads, each with two facilitated categories followed by comparisons of facilitated and unfacilitated categories. The presentation of memory loads was randomly concluded with mind-wandering probes, appraising the attentional focus of participants before comparisons. A Bayesian Regression, the difference of correct primed comparisons per minute between on-task and off-task reports was regressed against the difference between the correct unprimed comparisons per minute between on-task and off-task reports. The results indicate that mind wandering holds little to no ground over the implicit facilitation of cognition.

Setara Reddy, Junior, Psychology; Samantha Cassidy, Graduate Student, Psychology

Mentor: William Lechner

Examining the Association Between Biological Sex and Alcohol Moderation

The literature regarding the association between biological sex and alcohol moderation consisted of mixed results. Due to this, we examined the association between biological sex and success at achieving drinking goals. This study utilized an existing dataset from a clinical trial that examined alcohol moderation. We hypothesized that women would be less likely to achieve their drinking goals compared to men. To examine the association between biological sex and success at achieving drinking goals, we utilized linear regression, controlling for treatment condition, race, and age. We did not find a significant association between biological sex and success at achieving drinking goals ($\beta = 0.102$; $p = 0.463$). However, examining this topic further can help individuals mitigate their risk regarding alcohol consumption.

Daniel Reynolds, Senior, Psychology

Mentor: Micheal Daniels

Leadership Identity Development of Black Men While Navigating College

This literature review examines how mentorship, leadership identity, mental health, and college environments influence the leadership development of Black men in higher education. Using a constructivist grounded approach and drawing from various studies and dissertations, it highlights the importance of culturally inclusive programs and identity-affirming spaces in supporting leadership growth. The review explains how systemic barriers and underrepresentation in leadership roles can discourage other Black men from pursuing leadership opportunities. It emphasizes the need for institutions to create more inclusive, supportive environments that recognize diverse leadership styles. Overall, the study calls for stronger mentorship, cultural affirmation, and accessible leadership opportunities to improve representation and leadership development for Black men in college settings.

Amelia Rindfleisch, Senior, Psychology

Mentor: Jocelyn Folk

Acquiring Novel Word Knowledge: The Impact of Spelling Body Frequency

Previous research indicates that learning the spellings of novel words leads to a higher chance of acquiring the meaning, but mixed results have been found in the opposite direction. Research has also found that it is easier to acquire the spelling of a word if it contains more frequent spelling to sound relationships. This current study investigates the relationship between learning the spellings and meanings of novel words and the role that spelling frequency plays. 137 university students read a series of sentences, some containing novel words with high or low frequency spellings. Some sentences had semantic context for the novel words. After the participants read, their vocabulary knowledge of the novel words were tested. These data will have implications for learning new vocabulary.

Ally Sahay, Sophomore, Psychology

Mentor: Joel Hughes

“ADHD” Diagnosed or Not: College Students Report Similar Challenges

The transition to college can be challenging for students with ADHD. Whereas ADHD impacts outcomes such as distress, academic performance, interpersonal relationships, and mental health during college, research comparing the challenges of students reporting a formal diagnosis of ADHD, those who suspect they have ADHD, and students reporting not having ADHD remains limited. Students who self-reported ADHD reported similar challenges, irrespective of whether they had a diagnosis or had suspected (but unconfirmed) ADHD. They reported greater challenges than students who do not have ADHD. These findings suggest that subjective experiences of difficulty are relevant regardless of diagnostic status, highlight the need for effective ADHD assessment, and suggest that all students transitioning to college who report challenges commonly associated with ADHD should be supported.

Brendan Schall, Junior, Psychology

Mentors: Andrew Bowser, Emily Gawlik, John Gunstad, Karin Coifman

Words You Use Matter! How Does Affective Language Relate to Psychological Symptoms, Wellbeing, and Physical Health?

College students face significant risks to psychological health. Individual differences in affective language may be useful in assessing risk, reflecting deficits in spontaneous emotion regulation or proficiency (e.g., positive reappraisal). Data were collected from undergraduates at a Midwestern university (N=170), recruited as part of a larger longitudinal study. Participants reported on psychological symptoms, wellbeing, and physical health, and recorded themselves talking about the “best” and “worst” events of their semester. We expect that emotion words used to describe stressful and pleasant events will predict concurrent psychological symptoms. These findings will demonstrate the utility of implicit markers of spontaneous emotion—here, affective language used to describe positive and negative events—in predicting psychological health, wellbeing, and physical health among college students.

Gavin Sefsick, Senior, Psychology

Mentor: Rachael Blasiman

Comparing Prefrontal Cortex Activity Between Passive and Active Learning Using fNIRS

This study will be a true experiment that uses a within-subjects design. Participants will be randomly assigned to either the active retrieval (flashcards) or passive rereading (rereading notes) condition. When in the active retrieval condition, participants will use flashcards to study for a quiz on a lecture they have not previously seen. Participants in the passive rereading condition will read notes taken on the lecture to study for the quiz. Changes in Prefrontal Cortex Activity will be measured using an fNIRS device to monitor oxyhemoglobin levels, or the ratio of oxygenated to deoxygenated blood in the brain.

Elise Simmons, Senior, Psychology; Logan Marquis, Junior, Psychology; Kendyll Cochrane, Junior, Neuroscience; Ty Sembrat, Senior, Neuroscience; Bruna Silva, Senior, Psychology; Masiella Grob, Junior, Psychology

Mentor: Lee Gilman

Male, But Not Female, Mice Eat Proportionally Less Low Salt Food Yet Maintain High Salt Food Intake After Stress

Salt (NaCl) improves food palatability, and people frequently consume more than needed. Stress can augment palatable food consumption, yet few studies have assessed stress' effects on eating salty food and many excluded females. I'm assessing how stress affects mice's choice of more versus less salty food, hypothesizing increases across sexes of more salty food choices following stress, while no stress mice's choices will stay constant. So far, stress decreases overall proportional eating regardless of sex, but only in males is this drop selective to less salty food. This suggests stress disproportionately promotes salty food eating in males and not females. Ongoing research is evaluating aldosterone, a stress-responsive hormone regulating salt retention, in these mice. My findings highlight sex differences in salty food choices after stress.

Patrick Straits, Senior, Psychology

Mentor: John Gunstad

Social Support and Physical Activity in College Students

The mechanisms by which Physical Activity (PA) benefit mental health remain unclear, but may involve greater social connection found in team sports or group activities. We examined whether PA levels were associated with greater social support in undergraduates enrolled in the Kent State University Student Life Study. Though no correlation was found for women (N = 583), greater PA was associated with higher levels of social support for men (N = 150). These findings need clarification and replication, but raise the possibility that the social connectedness young men receive from PA is crucial to their mental health.

Predrag Tolmachev, Senior, Psychology

Mentor: Jocelyn Folk

Metacognitive Monitoring and Word Learning

The proposed thesis is concerned with the relationship between three variables: Individual differences in metacognitive monitoring, incidental vocabulary learning, and individual differences in lexical skill. The relationship between word learning and lexical skill is already well established. We know from prior research that higher lexically skilled individuals perform better in word learning studies across a series of metrics including word meaning and spelling compared to their lower skilled counterparts (Eskenazi, Swichuk, Folk, & Abraham, 2018). Furthermore, exposure alone does not seem to explain the lack of learning in lower-skilled readers as even with many exposures they continue to struggle (Rundus & Folk, 2026). We theorize that the reason the lower-skilled readers struggle is due to ineffective monitoring. We hypothesize a positive correlation between lexical skill and monitoring effectiveness given that individuals with higher lexical skill possess better mental representations of their vocabulary (Perfetti, 2007).

Social Science/Public Health and Speech Pathology

Cadence Bryant, Freshman, Early Childhood Education; Brooklyn Crampton, Freshman, Fashion Design; Elliot Wall, Freshman, Public Relations; Beverly Williams, Freshman, Criminology and Justice Studies (General)

Mentor: Jasmin Johnson

Expanding Flashes 101: Incorporating Sustainability Education into Course Material

We are passionate about making undergraduate students at KSU more conscious of the dangers of overconsumption and waste. Our group noticed students overuse non-recyclable products in their daily lives. We aim to increase sustainability education for students at Kent State University through an added module in Flashes 101, as there is no formal campuswide education on the subject. Our group will employ various research methods. The results of teaching students about sustainability will have a positive impact because we believe students are unaware of the amount of harm their actions have on the environment. The goal of our project is to educate the students on the impact of their actions and guide them to live more sustainably by adding a sustainability module into Flashes 101.

Annie Fink, Senior, Environmental Studies

Mentor: David Kaplan

The System of Provisioning : Tackling Food Insecurity Through Community-Based Food Assistance in Mahoning County

Over one-eighth of American households experience food insecurity, the lack of access to sufficient, safe, and nutritious food. Catalyzed by recessions and heightened food insecurity in the 1970s, emergency food assistance programs, which include food banks, pantries, soup kitchens, and no-cost distribution models, emerged as valuable provisioning systems. While previous research emphasizes federal assistance programs and recipient perspectives, this study examines the organizational structures and guiding values of community-based food programs in Mahoning County and how these factors influence operational efficiency. Conversations with program directors revealed two themes influencing efficiency : partnerships and funding. Findings revealed that all locations prioritized nutrition as an imperative; however, limited funding constrained ability to support it. Results indicate that collaborative networks among local provisioners strengthen food security within their communities.

Mindy Hardy, Senior, Speech Pathology and Audiology

Mentors: Jennifer Roche, Elenor Rundus

Semantic and Orthographic Similarities in Words and Their Effects on the Nelson Denny Test

To be elastic is to be: rigid, rigorous, elated, expandable, or exacting. This is an example of a question from the Vocabulary section of the Nelson Denny Test. To most who speak English as their first language, the answer is clear: to be elastic is to be expandable. But if you didn't know what the word elastic meant, you might pick the word elated... Why is that? The answer lies in how words relate to each other. Words can be semantically similar or orthographically similar. Semantically similar words have a similar meaning, while Orthographic similarity refers to the degree to which words resemble each other in their spelling patterns. Orthographic similarity can be measured in statistical methods such as the Levenshtein distance, measuring the number of edits needed to transform one word into another, each edit adding 1 to the distance. The words Void and Empty are semantically similar, whereas Tired and Tried are orthographically similar. Adult reading comprehension is a data field that is relatively less studied field in comparison to reading comprehension ability in children and adolescents.

Koussay Jaballah, Junior, Computer Science

Mentor: Ikram Toumi

Bias In Research: Factors and Mitigations

This study explores the multifaceted issue of bias in research, focusing on perceptions, awareness, and attitudes surrounding the topic through a quantitative approach. Bias in research refers to errors that compromise transparency and accuracy in findings, occurring at any stage—from data collection and analysis to reasoning and interpretation. The study measures public awareness of research bias and examines how researchers recognize and address it. Various factors influencing bias were analyzed, and potential strategies for its reduction were proposed. Ultimately, the study seeks to enhance understanding of research bias and support evidence-based efforts for its mitigation.

Madison Jackson, Senior, Sociology (General)

Mentors: Tiffany Taylor, Andrew Barns

Community Development Corporations' Efforts in Increasing Housing Equity Improve Individuals' Access to Opportunities and Resources.

Our study worked with CDC's seeking to improve housing equity. We studied their efforts to analyze their effectiveness and impact through interviews, archival research, and participant observations. The purpose of our study was to provide a list of the best effective approaches to promoting housing equity for the CDC's. A key result found was that housing impacts access to resources and opportunities in income, education, and employment. CDC's efforts in improving access to safe, stable housing may also improve socioeconomic status. I was interested in learning about how housing is inequitably distributed in racialized groups and how the efforts of CDC's were combating this inequitable distribution by improving housing equity. As the study progressed, I became interested in how housing impacts socioeconomic status.

Deepa KC, Junior, Criminology and Justice Studies (General)

Mentor: Hedi Nasheri

Emerging Technologies: AI, Power, and Democratic Accountability

Artificial intelligence is increasingly shaping government decision-making, influencing everything from predictive policing and investigations to welfare eligibility and risk assessments. While these systems are promoted as efficient and objective, their rapid deployment has outpaced meaningful regulatory oversight. AI is not neutral; it reflects the data and institutional structures from which it is built, often reproducing existing inequalities and disproportionately affecting marginalized communities. At the same time, the opacity of algorithmic systems limits transparency and makes accountability difficult when harm occurs. This paper argues that AI in governance must be understood not simply as innovation, but as a political force that redistributes power within democratic institutions. Without proactive, human-centered safeguards, AI-driven governance risks eroding public trust and weakening democratic accountability in the name of efficiency.

Kevin McCarty, Senior, Sociology (General)

Mentor: Elias Nader

A Sociological Examination of Urban Planning: How Built Environment Affects Residents' Sociability

Cities built before cars (ex. New York, Boston, Charleston) feature infrastructure that is more conducive to walking, cycling, and public transportation than driving. This allows for greater interaction between people and their environment, improving the sense of community and sociability. Urban planning research focuses on physical structures and layouts; however, there is considerably less research on the sociological aspects of urban planning and its impact on the sense of community among residents. This critical review study examines how built environments convey a sense of place and affect residents' happiness and sense of community. This critical review will compare and synthesize how these three aspects of city design offer insight into how urban planning can facilitate sociability and community building.

Hannah McCauley, Freshman, Journalism; Maggie Moiso, Freshman, Nursing; Siera Lawler, Freshman, Digital Media Productions; Tyler Haydu, Freshman, Early Childhood Education; AC Curet, Freshman, Fashion Design; Emanuel Allinos, Freshman, Theatre Studies (Performance)

Mentor: Em DeLoach

Smart Access, Better Care: Enhancing Transparency at DeWeese Health Center.

DeWeese Health Center is Kent State's on-campus health center for students and staff alike. With so many people and so little time, "Smart Access, Better Care" will improve patient care and clarity. The main objectives of this project are to update the current DeWeese Health Center Patient Portal and make documents more attainable through a new tab on FlashLine and/or on DeWeese's Patient Portal. The study will be conducted by students through a campus wide survey supported by interviews. Results are expected to provide a new system for an improved experience. "Smart Access, Better Care" would achieve simplicity of patient care, and contribute to the university strategic plan by improving the student experience and addressing a vital resource on campus.

Anya Michlberger, Senior, Classic (Classical Civilization)

Mentor: Kevin Adams

Tension and Change: Kent State's History Department in the 1970s

May 4th, 1970, launched a decade characterized by tensions and change for Kent State. Dealing with the legacy of May 4th, Graduate Program, and budget cuts, Kent State University's History Department was crucial in this transition. The new History Graduate Program was essential in Kent State's creation of graduate programs. Many educational opportunities were provided by the History Department, both inside and outside the classroom. Student protest skyrocketed, especially over remembering May 4th, with history students playing a large part. Toward the end of the decade, students and professors banded together against increasing economic difficulties. The History Department during this time not only reflects the larger trends in the Kent State community in general but also allows better understanding of the University today.

Daniel Mook, Junior, Digital Media Production

Mentor: Janice Kroeger

The Listening Project

The Listening Project works with numerous educational stakeholders in the Greater Akron Area to bring light and research to LGBTIQ+ concerns in educational spaces. The Akron area has very positive ratings surrounding the LGBTIQ+ community, though may lack support for LGBTIQ+ and gender diverse youth. This project aims to understand how advocate groups wish schools could provide further support for these students by using arts-based activities and focus group methods. These activities and focus groups are recorded and compiled into educational digital shorts for advocacy groups. Piloting of interview, focus groups, and arts-based methods have commenced. Once all of our digital media has been collected, it will be curated, scrubbed, and edited into short digital videos to help educate people such as principals and teachers.

Madison Paoletta, Senior, Integrated Language Arts

Mentor: Nicole Willey

The Influence of Social Media on Gender Identities

The interpretation of “masculinity” and “femininity” among young adults has shifted alongside widespread social media adoption. In the United States, approximately 90% of adults aged 18–29 use social media daily, exposing them to curated norms that may shape gender identity. We conducted a mixed-methods cross-sectional study examining perceptions of masculinity and femininity among 60 adults aged 18–25 who reported consistent social media use. Semi-structured interviews were conducted with 4 transgender and/or gender-fluid participants. Descriptive statistics characterized social media engagement, and participants provided adjectives describing masculinity and femininity. Qualitative thematic coding identified three dominant themes: social media as a primary influence on gender identity, exposure to influencer-mediated norms that may negatively impact identity expectations, and social medias a mechanism for positive identity exploration.

Jacqueline Phillips, Senior, Music Education (Instrumental)

Mentor: Jennifer Johnstone

A Different Kind of Trap: The Need For Specialized Music Education for Twice-Exceptional Students with Adverse Childhood Experiences

Twice-exceptional students that come from marginalized backgrounds and have Adverse Childhood Experiences are not recognized on a holistic level by the education system. We see many troubled students in music education that are incredibly gifted leaders. However, the student’s strengths overshadow their struggles and their weaknesses, such as poor emotional regulation or executive dysfunction, overpower their achievements. In music education, the most recent and promising theory is that safety is the most significant priority when students are vulnerable in the music classroom. This is known as trauma-informed music education. The goal is to find what causes this dichotomy within a student and most importantly, how to capitalize it. Looking ahead, I hope to interview students and educators across various demographics, focusing on their musical preferences and life themes, adapt content, test Field’s theory in classrooms, and develop training for educators.

Cassidy Shaffer, Junior, Speech Pathology and Audiology

Mentor: Ali Brikroo

Physical Correlates of Swallowing Function in Community-Dwelling Older Adults

Dysphagia becomes more prevalent with age and can significantly reduce quality of life. Swallowing is not an isolated function and may reflect broader neuromuscular health. Muscle strength and frailty in geriatrics can be assessed using simple physical performance measures, including hand grip strength and walking speed. Few studies have examined the direct relationship between physical performance and objective swallowing measures. We hypothesized that physical performance measures would be associated with swallowing physiology and frailty. 31 community-dwelling older adults over the age of 60 completed swallow-screening questionnaires and performed a hand grip strength and walking speed test. Objective measures of swallowing muscle activity and tongue strength were obtained using surface electromyography and the Iowa Oral Performance Instrument. The results indicated that stronger physical performance was associated with stronger swallowing muscle activity and greater tongue strength. This indicates that low-cost physical performance measures may provide useful insight into swallowing function in elderly.

Jack Tillet, Freshman, Anthropology; Tallulah Showrank, Freshman, Early Childhood Education; Elliana Risma, Freshman, Marketing; Josie Kaiser, Freshman, Exploratory

Mentor: Anni Anderson

Well+

Personal hygiene is essential to overall health, well-being, and daily performance. Maintaining proper hygiene supports physical health, confidence, academic success, and social engagement. This proposal aims to enhance student well-being by installing 24/7 personal hygiene vending machines in residence halls and key campus locations at Kent State. These machines will provide convenient access to essential health and wellness items, including Tylenol, Benadryl, Tums, deodorant, feminine hygiene products, toothpaste, lip balm, and bandages. By partnering with campus services such as the Health Center, University Housing, and the CARES Center, we seek to ensure reliable access to necessities, especially during urgent situations. Increasing accessibility to hygiene products will promote a healthier, more inclusive campus environment and improve the overall quality of life for students, faculty, and staff.

Mallory Turnbull, Senior, Environmental Studies

Mentors: Elaine Hsiao, He Yin

LandBack Typology

The LandBack movement encapsulates the return of ancestral land to indigenous peoples. However, the act of land return has existed outside of this movement since land was first unrightfully taken. The focus of our research was to analyze how LandBack was discussed in scholarly articles and the authors' choice of language surrounding the objectives of LandBack in comparison with how LandBack is understood outside of academia. We compiled these descriptions into 20 different "definitions" as a way to develop the typology surrounding LandBack. We presented some of these definitions at the California Native American Tribal GIS Summit and received feedback from Californian Indigenous peoples. This work can be utilized better conceptualize LandBack and develop a common language around it for land return policies.

Tommy Varley, Freshman, Athletic Training; Abby Jencks, Freshman, Zoology; Ashley Raber, Freshman, Visual Communication Design; Lily Gerald, Freshman, Fashion Design

Mentor: Mac Myers

Pathways to Healing

In 2023, Kent ranked third out of 17 cities in Portage county in the number of overdose-related deaths, including those involving fentanyl, methamphetamines and alcohol. These numbers show that substance use and mental health challenges are serious concerns in our community. This project proposes a partnership between Counseling and Psychological Services (CAPS) and Kent State of Well-Being to create a recovery-focused space on campus. The center will combine counseling and wellness programs to support students facing behavioral health challenges. Certified counselors and healthcare professionals will teach healthy coping skills, stress management strategies, and recovery tools. We will also distribute student surveys to better understand campus needs and interests. This initiative aims to provide accessible support and encourage positive change for students seeking recovery and improved well-being.

Emily Youtsey, Senior, Public Health (Allied Health)

Mentor: Sheryl Chatfield, Anita Slack

A Scoping Review on Social Media Addiction Among College and University Students in the United States

Public health data suggests that social media use can potentially have negative impacts to mental health. These impacts can be more prominent in adolescents and young adults. The purpose of this scoping review was to investigate research that is focused on social media addiction among college students in the United States. Our research team identified 748 potential articles through a database search. After reviewing titles, abstracts, and reference lists, we determined that 12 articles met our criteria. Convenience sampling methods, cross sectional surveys and the Bergen Facebook Addiction Scale were used nearly all of the studies. The key findings showed relationships between problematic social media use, impulsivity, stress, and poor sleep quality. Future researchers should consider using comparison groups and longitudinal methods to gather data.

Noah Zollinger, Senior, Geology

Mentor: Erin Metin

Naturaliths and the Origins of Tool Use

The origin of hominin tool use is a largely inferential area of study. However, the ‘cognitive leap’ often asserted in the development of the first stone tools is inconsistent with evolutionary theory. Kent State anthropologists, leading a group of global colleagues, have proposed a new hypothesis for a ‘missing link’ that transforms the emergence of technology into a more gradualist, incremental process. Sharp lithic fragments, referred to as ‘naturaliths’, are produced by the environment, providing cutting edges without the need for anthropogenic modification. I conducted a controlled experiment in which standardized glass cores were either heated or flintknapped, and then tested the resulting flakes for sharpness. It was found that the heated flakes, in general, were higher quality than the knapped flakes.