

**UNDERGRADUATE SYMPOSIUM ON
RESEARCH, SCHOLARSHIP, AND
CREATIVE ENDEAVORS**



MONDAY, APRIL 17, 1-5 P.M.
Kent Student Center,
Kent Campus

「 If you have the passion for research, you
will go above and beyond in your studies. 」

Wayne Nieh,
Senior, Nursing



Welcome from the Vice President for Research and Sponsored Programs

I warmly welcome all the undergraduates and faculty mentors involved in the tenth 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 Sponsored Programs

Special Thank You

Sheila Pratt, who helped organize the 2023 submission categories for the Undergraduate Research Symposium and collected the necessary data for our master list of student submissions.

Sheila has worked at Kent State University for over twenty-three years. Currently, she is working with Research and Sponsored Programs, as well as assisting the Office of Student Research.



Griffin Wold, who collected student submissions, edited abstracts, and designed the interior of the program for the 2023 Undergraduate Research Symposium.

Griffin is a senior Spanish Translation major. They have been working at the Office of Student Research as a Marketing and Communications Assistant since January 2022.

Hanish Bhogadi, who created and edited the design for this year's symposium brochure cover.

Hanish is a graduate student studying Business Analytics. He has been working at the Office of Student Research since August 2022.



Michael Hawkins, who provided his expertise with our student researchers on writing the abstracts for their symposium submissions.

Michael is the Data Librarian and Head of Map Library in Research and Instructional Services at Kent State University.

Special Thank You

Hilary Kennedy, who is head of the Student Multimedia Studio at Kent State University and assisted students in creating the posters for the presentations at the symposium.

She works closely with maker technology and multimedia at University Libraries.



Zach Mikrut, who instructed students on the appropriate and effective presentation style and delivery for their research at the Symposium.

Zach is the Director of LaunchNET at Kent State University. He assists students, faculty, and alumni in entrepreneurship and innovation.

All the faculty mentors, who invested time and energy into our wonderful scholars. The dedication our faculty mentors have given our students ignites the spark they have for research and prepares them for their future studies and careers.

Special thank you to **Justin Edwards**, director of Career Exploration and Development; and **Celeste Dawson**, student success coordinator.

Special Thank You to Our Sponsors



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Aeronautics/Engineering/ Computer Science/Mathematics

Hayley Dees, Sophomore,
Aerospace Engineering

Mentor: Ali Abdul-Aziz, Ph.D.

*Winglet Shape Aerodynamic
Impact on the Performance of an
Aircraft; An Experimental and an
Analytical Evaluation*

Research into drag-reducing wingtip devices called winglets began at NASA in the 1970s. Due to the high cost and complexity of designing an aircraft equipped with such devices, most recent research has been accomplished via computer simulation. In this study, model airplanes with a plain wing, blended winglet, Whitcomb winglet, and spiroid winglet were designed and 3D printed to fit inside the test section of an AF100 subsonic wind tunnel. The lift-to-drag ratio and coefficients of lift and drag were recorded at different velocities and angles of attack to prove that the application of these winglets decreases induced drag. It was determined that the blended winglet is most effective for implementation due to overall drag reduction and lower complexity to manufacture and maintain.

Cameron Gmitra, Senior,
Actuarial Mathematics

Mentor: Aloysius Bathi
Kasturiarachi, Ph.D.

*Modeling Mutual Funds with
Bollinger Bands*

The price fluctuations in the stock market are an example of a random process. We explore how to model the stock market through the application of Bollinger bands. Bollinger bands provide a floor and a ceiling for the stock price of a given fund based on past performance. Using a variety of statistical methods based on historical data, the prices of the stocks can be modeled along with their Bollinger bands to gather, buy, and sell signals and make useful predictions. The application of this technique gives a clear, simple way to understand the behavior of any chosen asset and help investors make informed decisions. Two mutual funds will be depicted visually along with their Bollinger bands and associated analysis.

Katie Horn, Junior, Aeronautics

Mentor: Syed Shihab, Ph.D.

*Motion Prediction of Birds to
Prevent Bird Strikes with Lower
Altitude Aircraft*

Electric aircraft offers new possibilities for package delivery and passenger transportation using drones, but bird strikes pose a significant risk at low altitudes. This research project develops regression models to predict bird movements using GPS-based surveillance data. The nonlinear regression model has higher prediction accuracy during training, but the linear model performs better in testing. A deconfliction algorithm assigns departure delays or advancements to aircraft based on bird movement forecasts to prevent collisions. It assigns a delay of up to five seconds if there is a potential bird strike, followed by an advancement of up to five seconds if the risk persists. This approach minimizes bird strikes and enhances the safety of air travelers and birds.

Julian Leff, Freshman, Computer Information Systems

Maya Saba, Freshman, Fashion Design

Anni Anderson, Freshman, Fashion Merchandising

Essence Holloway, Freshman, Sports, Exercise & Performance Psychology

Kyle Bartlett, Freshman, Business Analytics

Lily Stenroos, Freshman, Environmental Studies

Azzure Alexander, Freshman, Theatre Studies

Kiki Kiskadden, Freshman, Fashion Merchandising

Jeremiah Lockett, Freshman, Psychology

Jocelyn Sampson-Dickerson, Freshman, Fashion Design

Mentor: Kevin Bahner

Flashcard to Smartphone Wallet

Our team has taken on the challenge of finding ways to make Flashcards more convenient for students on our campus. Through surveying the student body, we found that 93% of the 114 students would benefit from having their Flashcards in their digital wallets. We plan on advocating to get approval for Flashcards to be moved to a digital wallet, making Flashcards more accessible and convenient for students. We are collaborating with the Flashcard Office, University Housing, and IT department to ensure budget approval. Having the Flashcards available in digital wallets will make student life on campus more convenient. Compared to outdated apps like mobile ID (a third-party app), our digital wallet integration will be more efficient and reliable to use.

Sydney Maller, Senior, Aerospace Engineering

Mentor: Yanhai Du, Ph.D.

Zero-Emission Propulsion

Developments in aviation are closely associated with performance characteristics; however, there are other important advancements to consider. Aviation is consuming a noteworthy amount of our total carbon footprint here on Earth with no foreseeable decline. Hydrogen Fuel Cells are a promising alternative to standard jet fuel, with no carbon footprint. The main focus of this research is commercial flight; however, the intent of this research is to broaden the implementation to all types of propulsion.

“Research is formalized curiosity. It is poking and prying with a purpose.”
~ Zora Neale Hurston

Sophia Matar, Junior,
Computer Science

Mentor: Jong-hoon Kim, Ph.D.

*Design of a Mixed Reality-Based
Immersive Virtual Environment
System for Social Interaction and
Behavioral Studies*

Advancements in immersive technology create sophisticated environments merging physical and digital reality. Virtual reality is fully immersive, replacing reality with a simulated environment. Augmented reality mixes the virtual and natural worlds. Both have limitations such as needing to wear a head-mounted device. We propose a physical space for users to interact with a shared mixed-reality environment without wearables. In this presentation, we discuss the developed system and demonstrated its feasibility.

Nathaniel Miller, Senior,
Actuarial Mathematics

Mentor: Aloysius Bathi
Kasturiarachi, Ph.D.

*Stopping Time Patterns in the
3k+1 Problem*

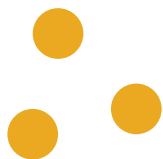
The $3k+1$ problem involves applying a function to a number until it reaches one, and the number of times it takes to reach one is called its stopping time. Previous research has examined the correlation of stopping times for consecutive numbers, but not for numbers that are close but not consecutive. This study analyzed the distribution of stopping times for larger intervals of numbers around large numbers. The stopping times of the shortcut $3k+1$ function were compared to a randomly behaving trajectory, and the results conflicted with the expected outcomes from a random system. The study suggests further analysis of the specific order of unique values and the creation of a model to explain the inverse correlation observed in this study.

Kyle Rediger, Senior,
Aeronautics

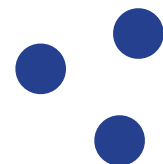
Mentor: Jason Lorenzon, J.D.

*The Future of Unmanned
Aviation*

The future of unmanned aviation is changing everyday, and with the new capabilities of electric vertical take-off and landing vehicles (eVTOL), many airlines have purchased these aircraft in hopes of expanding their operations into unmanned aviation. My work focused on looking into the legal side of making new airways and airspace that these aircraft and other unmanned aircraft are able to be a part of our stream of commerce. By working with the Ohio Department of Transportation, we are working towards a low-level system of travel for these unmanned aircraft. This research has led me to write a textbook that will be used here at Kent State and many high schools in our area to train new unmanned pilots and aircrews.



“Creativity requires input, and that’s what research is. You’re gathering material with which to build.” ~ Gene Luen Yang



Bailey Wimer, Senior,
Computer Science

Mentor: Jong-Hoon Kim, Ph.D.

*Intelligent Proactive Robotics
with Federated Learning*

This paper proposes a novel approach to enable robots to interact with humans in a more proactive and personalized way by using federated learning models. The proposed system allows Softbank Robotics' "Pepper" robot to learn from multiple decentralized data sources without disclosing the private information of its users. The objective of the model is to decide proactive actions Pepper should take under any given context. Through federated learning, robots can share and aggregate data to develop a global model that can make these decisions. Each Pepper also builds a local version of the model, which allows it to adapt to specific environmental differences such as household schedules and users' preferences. The federated learning model has shown high accuracy in tests using pseudo-randomly generated data.

Architecture

Stephanie Akhigbe, Senior,
Architecture

Mentor: Rui Liu, Ph.D.

*Embodied Carbon Emissions in
High Performance Buildings*

Over the summer, I worked with Professor Rui Liu to study embodied carbon emissions in high performing buildings. The sample building chosen for the research project was the Center for Architecture and Environmental Design. Over the course of the research, I studied the Life Cycle Assessment using Athena Impact estimator and Rhino modeling to analyze the carbon in the reinforced concrete parts as the focus of our research was embodied carbon. Due to the complexity of human behavior, it is hard to analyze other strategies like heating and cooling, daylighting and operational hours, although these can be analyzed at a later time. The conclusion shown by the graphs is the importance of Life Cycle Assessment and strategies used to mitigate embodied carbon emissions.

Mario Coachman, Senior,
Architecture

Mentor: Diane Davis-Sikora

*Mixed-Income Housing:
Proposing Solutions to the Lack
of Affordable Housing*

A common theme across disinvested neighborhoods is the trend of redevelopment. Many developers promise affordable housing creation but not all outcomes are as expected. Over my past research journey, I have learned various things regarding affordable housing creation and anti-displacement strategies. This year I want to develop case studies of various affordable housing initiatives and developers. In addition, I will be creating a rating system of their effectiveness and achievements in creating affordable housing to analyze the accomplishments of affordable housing developments. The main areas for evaluation include development projects in California, Ohio and New York, with various other affordable developments across the country. These case studies will become a section of our affordable housing and anti-displacement strategies toolkit.

Delan Lara, Junior,
Architecture

Mentor: Rui Liu, Ph.D.

*Kinetic Solution for Waterfront
Housing*

An ongoing dilemma for waterfront housing complexes is their increased vulnerability to hurricane trauma with severe wind loads continually leaving buildings in desolation and families rendered homeless for extended periods. This research will explore a rolling kinetic shell system that not only acts as a protective guard against the harshest elements but responds kinetically as a climate-responsive envelope. By analyzing and implementing successful structural innovations against the heaviest recorded wind loads, this project will incorporate a kinetic design constructed to serve as an integrated component specifically suited for the context and objectives of its users.

**Olivia Mansier, Senior, Interior
Design**
**Serene Hawes, Senior, Interior
Design**

Mentor: Tina Patel, M.F.A.

*Malleable Spaces for
Neurodiverse Individuals*

The Center for Applied Drama and Autism, provides opportunities for individuals on the Autism Spectrum, and their communities through applied drama and theater. We were challenged to design the prototype for this center with the objective to take a socio-political approach to benefit people with different sensory needs by providing an inclusive environment in which they can participate in meaningful activities and life skills. Our research indicated that neurodiverse individuals have different sensory needs, and we explored what it means to design a space that could accommodate every single user by considering their personal sensory needs and giving them agency in their space. This was achieved through malleability, which acknowledges the capacity to change in response to a force.

Charles Nettle, Senior,
Architecture

Mentor: Rui Liu, Ph.D.

*Investigation into 3D Printing as
a Viable Construction Method for
Full-Scale Buildings*

After emerging in the 2000s, 3D printing has developed exponentially in the consumer and professional markets, including the field of architecture. Beyond small-scale plastic filaments, the technology has evolved to allow for entirely fabricated, habitable structures to be made of layered concrete; however, this construction method does not come without its drawbacks. The project is intended to evaluate 3D printing's role in architectural design and construction as a whole; how do these buildings impact their environments, where is the technology going, and where can the medium be improved upon? To analyze the technology's impacts, the study will require the documentation of case studies from existing 3D-printed building projects and information regarding where the technology is headed through upcoming project proposals.

Megan Porter, Junior, Visual Communication Design

Mentor: Rui Liu, Ph.D.

The Exploration of Jammed Light Weight Aggregates to Create a Green Wall

My Summer Undergraduate Research Experience project involved researching, designing, and building a green growing wall through jamming lightweight dredged aggregates. My mentor and I worked collaboratively in order to find a method that aligned with the goal of finding a sustainable construction method. Specific duties included reading extensive research papers and articles on the processes of jamming and growing, as well as experimenting with different techniques of jamming. Throughout the project, I developed a design and method to create the wall to be functional, sustainable, and aesthetic. Various methods and designs were tried until a final, most effective one was found, which we plan to one day use to construct a green wall.

Timothy Wagner, Senior, Architecture

Mentor: Rui Liu, Ph.D.

Aesthetics of Overhead Structurally Supported Staircases

Structurally supported staircases from above are a curious method of circulation to explore whether they are structurally sound and a viable circulation option for designs. How much anchor force is required to support the staircases from above, and can each step rung be supported individually, independent from other stairs? Additionally, why were these vertical structure moments chosen over a normally supported staircase? Performing case studies with structurally supported staircases and walkways in addition to determining spans, loads, and tension supported cable strength will be the main method to answer this research question. Finding reasoning behind the decisions to choose this structural element will also be apart of the research.

Emma Weaver, Senior, Interior Design

Kara Mayor, Senior, Interior Design

Mentor: Tina Patel, M.F.A.

Unstructured: A Paradoxical Approach to Sensory Design

The Center for Applied Drama and Autism (CADA) in Akron, Ohio, is an after-school program for neurodiverse students to learn life skills through applied drama and creative writing. We were challenged to design a prototype interior space for CADA, and started with extensive research to get a fundamental understanding of the sensory needs of neurodiverse individuals and different spatial responses. To represent CADA's vision we selected the concept of unstructured: a paradoxical approach to sensory design. This is achieved by creating contrasting spaces of high structure and seemingly unstructure. This allows the students to find refuge, release energy, or find comfort. By designing an environment that adapts to their growth, this unstructured space will encourage students to explore the interactive interior at their own pace.

Art/Fashion Design & Merchandising

Alexandra Baxter, Senior,
Theatre Design

Mentor: Fabio Polanco, M.F.A.

*A Bilingual Experience: A Trip to
Bogotá Through Theatre*

A veces uno se olvida de los sencillos placeres que la vida le regala. Sometimes one forgets the simple pleasures that life gives you. LatinUs Theater Company is the home of the U.S. Premiere of *La Siempreviva*, written by Miguel Torres, which is about the siege of the Palace of Justice in Bogotá, Colombia. Pursuing theatre in one's native language is a powerful experience; however, adding another language to the process is stepping into a new world. Not only did it highlight these stories, but it also offered connections to the audience, and they left emotionally moved after every performance. This presentation demonstrates how through this research and creative experience, the team, with different primary languages, joined to share art and highlighted the stories of underrepresented communities.

Mayhugh Fox, Senior, Dance

Mentor: Jeffery Rockland, M.F.A.

Connecting Israeli Dance to Kent

The student organization East Meets West creates opportunities for artistic collaboration, engages diverse educational experiences, and builds global citizens through the medium of dance. As the Student President, I have developed research and relationships with Israeli contemporary dance. This included bringing in an Israeli guest artist for choreography, classes, and a lecture; traveling to work with the Kibbutz Contemporary Dance Company; a study abroad dance program in Jerusalem; and working with MASH Dance House Jerusalem on a global dance project through virtual reality. It is both important and impactful because it gives students the opportunity to learn beyond our country and become well-rounded individuals and dancers. It has helped expand the opportunities, choreography, and minds of many students within the Dance Division at Kent State.

Cameron Genet, Senior, Art
History

Mentor: Gustav Medicus, Ph.D.

*Factors Influencing Florentine
and Venetian Art in the 15th
Century*

Looking at the Italian cities of Florence and Venice during the 15th century, there are many factors that play into the process of producing art. There were new techniques and styles during this time period, and each of these cities mastered their own unique way of painting. Some of the factors that influence these differences include technique, patronage, as well as influences adapted from different cultures from outside of Italy. The techniques that were used in Florence and Venice were vastly different in approach, but they are still able to produce paintings with similar messages and meanings. The patronage as well as outside influence seen by both of these cities affect the artistic endeavors of the cities and helps make them unique from the other.

Katarina Guenther, Senior,
Fashion Design

Mentor: Linda Ohrn-McDaniel,
M.F.A.

Microbial Cellulose

How can the microbial cellulose made from kombucha bacteria be used in and influence a fashion collection? The garments produced in this BFA thesis explore the production process of a vegan leather alternative. This culture can grow larger than a cow's hide in a fraction of the time. Traditional leather has caused pollution due to the tannin chemicals and waste created in its production. The fashion industry depends on changing to environmentally conscious design, and cellulose is a step in the right direction. The futuristic concept of bacterial leather is an inspiration for the styling of the garments creating a futuristic/dystopian element to the collection. Many design elements are influenced by the layers produced in the microbial cellulose and the rectangular shapes of the growing containers.

Xavier Heipp, Senior, Theatre
Studies

Mentor: Yuko Kurahashi, Ph.D.

*Conjuring Shakespeare's Kings,
Witches, and Fools*

My presentation is on the contemporary meanings and influences of Kenny Leon's all-black production of *Much Ado About Nothing* (2019) and Tara Moses' Indigenous cast production of *Othello* (2022). This presentation is part of a larger project that my mentor, Dr. Yuko Kurahashi, and I have been working on through the Summer Undergraduate Research Experience: *Conjuring Shakespeare's Kings, Witches, and Fools*, a book dedicated to making Shakespeare more accessible to students and teachers at high school and collegiate levels. The presentation's goal is to demonstrate how Kenny Leon and Tara Moses use Shakespeare and different theatrical elements to create diverse and relatable stories that give a voice to underrepresented groups in the modern day.

Kristen Kubek, Senior, Fashion
Merchandising

Mentor: Catherine Leslie, Ph.D.

*Exploring Concepts of Femininity
and Masculinity; Consumer
Perspectives on Gender
Expression in Menswear*

Throughout the past few centuries, mainstream menswear fashions have oscillated between taking on traditionally feminine qualities and returning to a hypermasculine approach. Dress not only serves as a form of self-expression, but as a mirror into the sociopolitical happenings of society at a given time. The rising focus on gender fluidity and a new approach to masculinity in contemporary styles has created space for the widespread adoption of fashion elements typically considered to be feminine. This allows for a nuanced approach that differs from past perspectives. This study uses an analysis of previous fashion movements as well as data collection of 214 participants on current consumer sentiment and shopping behavior to inform a forecast for the future of gender expression through menswear.

Madison Michaelis, Senior,
Art History

*A Window into an Artist's Life: An
Analysis of Francisco de Goya's
Physical and Mental Health Seen
within His Self-Portraits*

Historical research indicates that Francisco de Goya suffered from intense illness throughout his life, which can be attributed to a combination of an immune disorder and form of mental illness. Self-portraits created during different periods in the artist's life show distinct changes in his health and art style. The self-portraits' formal artistic properties, historical context, and signs of health show a decrease in mental and physical health along with an increase in artistic expression. Personal and political events also caused a change in the artist's health leading towards a shift in depicting darker subject matters. Inspecting an artist's self-portraits, such as Francisco de Goya, allows audiences to relate the visual display of decline in mental and physical health to their own selves.

Joseph Miglio, Senior, Fashion
Design

Mentor: Linda Ohrn-McDaniel,
M.F.A.

Bonnet

The goal of my collection is to explore the relationship between oversized and undersized silhouettes and gender identity, as well as how layering can affect how gender is perceived. To try and achieve this, I experimented with adding volume to various parts of traditional garments as well as shrinking some. The result of my research is a seven look collection entitled BONNET. All of the looks in this collection utilize very drapery and playful silhouettes to obscure the female form. Through this collection I also delve into headwear, oversized silhouettes, and knitwear development.

Alena Miskinis, Senior, Music
(Piano Performance)

Mentor: Joshua Albrecht, Ph.D.

*Encoding and Decoding Intended
Musical Expression through
Figurative Language*

Although musicians and nonmusicians alike use figurative language to describe music, the relationship between a performer's intended expression and the audience's perception is still unclear. Using a lens model approach, we examined how performers acoustically encode figurative descriptors and how accurately listeners decode the intended expression. Participants were asked to listen to and to rate 60 excerpts of music based on five given metaphors: cold, dark, lively, mournful, and tender. Excerpts were taken from the previous study in which instrumentalists performed music with these different metaphoric expressions. Preliminary results show that participants were significantly able to accurately decode the encoded musical expression. Additionally, there was a large positive correlation between matched and mismatched metaphors.

From Zero-Waste Design to Digital Knitting: A Journey

In the journey of exploring zero-waste design approaches, I learned about digital knitting that reduces up to 30 percent of the material waste (including fabric, dyes, and chemicals), is more sustainable, and fewer human forces are needed to work on the machines resulting in the creation of fewer carbon footprints. Then, we gathered basic information about the active manufacturers of knit goods in the state of Ohio (their addresses, contact number, website, etc.). We made a dataset of them regardless of their scale, and our goal is to reach out to those manufacturers that are interested in the sustainable production of knits and support them to extend their business to interdisciplinary fields as a part of the Ohio Department of Higher Education grant.

Cultural Exchanges on the Silk Roads as seen through Central Asian Textile Design

The Silk Roads are known for their importance in connecting Eurasia in antiquity at a scale not previously seen. As a result, textile arts were able to experience their own globalization. When viewing the significant designs, patterns, and motifs in certain ancient textiles, it is clear to see the connection between East and West. In my research, two textile pieces will be investigated, both created and excavated in Xinjiang and containing recognizable western images of the time such as centaurs and pomegranate trees. Through the iconographical study of these pieces, contact can be proven between the two empires to show the importance of textile history in the broader context of art history.

Re-Femme(inine)

Historically, the femme fatale woman was feared. She portrayed an allurements of darkness and destruction while utilizing her feminine irresistibility to enchant men. Her existence was born out of sexist beliefs. She was powerful, but for the wrong reasons. Film noir commonly portrayed the femme fatale archetype as a loveless monster, only interested in personal gain. How can we subvert this unnerving stereotype to help identify women's empowerment? Previously derived from the male gaze, how can femme fatale be redefined through a modern female gaze? Rather than being viewed as a lethal weapon, I want to portray femme fatale as a positive force to be reckoned with. I aim to answer the following question with this collection: How are female archetypes relevant in contemporary society?

“Something you will find here at college is you are supposed to learn, and as you learn and start asking questions, you start thinking about how things can be improved. As your time here is spent, you will start to develop questions, which is the starting point of the research you could be doing.” ~ Xavier Heipp

Wendy Weng, Senior, Fashion Design

Mentor: Linda-Ohrn-McDaniel, M.F.A.

The Ocean Today

The goal of this research is to bring public attention to the ongoing crisis with pollution in the coastal area and allow consumers to be more conscious when they shop and dispose of products along with their by-products. According to REPREEVE, a company that focuses on creating sustainable fibers from recycled materials, "each year, at least 8.8 million tons of plastics make their way into the ocean, which is the equivalent of dumping the contents of one garbage truck into the ocean every minute." To emphasize, REPREEVE filaments are used in this collection. Pieces are created to reference marine pollution; applications are created with plastic pallets, epoxy, and 100% recycled polyester.

Biology - Cell

Mariam Awad, Junior, Biology
Zoha Shaikh, Junior, Medical Technology

London Anderson,
Sophomore, Integrated Health Studies

Mentors: Jennifer McDonough, Ph.D., & Ernest Freeman, Ph.D., & Robert Clements, Ph.D.

Restoring Metabolites to Enhance Remyelination in Multiple Sclerosis

Multiple sclerosis (MS) is an inflammatory neurodegenerative disease of the central nervous system. MS can impair the motor, sensory, and cognitive processes. The methyl donor betaine and the brain metabolite N-acetyl aspartate (NAA) are depleted within the MS brain. We have hypothesized that supplementing with betaine and NAA will support the myelin making cells (oligodendrocyte cell), required for tissue repair. We tested our hypothesis in cell culture using human MO3.13 oligodendrocytes cells. The cells were treated with the different metabolites, and myelin protein concentrations were measured. More experiments need to be done to quantitate the effects of these metabolites, but we believe that based on our data that both betaine and NAA may improve tissue repair in MS.

Roman Giacomino, Junior, Biotechnology
Dinah Walter, Senior, Biology
Guensu Jang, Senior, Biology

Mentors: Colleen Novak, Ph.D., & Christina Watts

Mice Muscle Thermogenesis in Response to Predator Odors: A Sex-Based Analysis

By quantitatively measuring the change in skeletal muscle thermogenesis, we sought to answer whether or not male and female mice have different responses to thermogenic stimuli. Here, we investigate these differences by comparing skeletal muscle temperature between male and female mice in the presence of 3 different predator odors and a control odor. Female mice display habituation to repeated exposure to control odor or cat odor, but not ferret or rat odors. Based on this, we can conclude that female mice require additional habituation compared to males to minimize the thermogenic reaction to baseline experimental conditions. With mice being one of the most commonly used animal models, it is important to be conscientious of these sex-based differences in reactivity and habituation.

Alaya Kiser, Sophomore,
Neuroscience

Mentor: Lique Coolen, Ph.D.

*Exploring SCI-Induced Changes in
Glutamate Signaling in the Spinal
Ejaculation Generator*

A majority of male spinal cord injury patients suffer from ejaculatory dysfunction. Prior research in our lab established that this reflex is mediated by lumbar spinothalamic cells (LSt) in the L3-L4 segment of the spinal cord named the spinal ejaculation generator (SEG). The neurotransmitter expression in LSt cells remains unclear, but the purpose of this study was to investigate the outputs of LSt cells onto autonomic nuclei to determine if these outputs are glutamatergic and if these outputs are altered by SCI. While the role of glutamatergic connections in the SEG is unclear, it was determined that a small subset of LSt synapses onto preganglionic neurons in the IML are glutamatergic and these connections were not altered by SCI.

Hannah Lee, Senior, Biology

Mentor: Robert Clements, Ph.D.

*Analysis of Astrocyte Subtypes
Using Automated Computational
Approaches*

Microscopic image analysis is a critical part of interpreting experimental data and the use of a plugin or a machine learning implementation would speed up the process and reduce human error. The two methods, ImageJ (FIJI) that uses a plugin for image based segmentation and custom trained machine learning implementation that uses Faster RCNN and UNET++ on multichannel astrocyte images, automatically extract metrics from spatial confocal data sets applied to micrographs of astrocytes acquired from mouse brain tissue. Both methods were able to extract cells from the provided data with good accuracy and can differentiate between cell types. Use of these types of automated methods increase throughout, reducing human error and increasing data reproducibility.

Austin Mahajan, Senior,
Biology

Kira Düsterwald,
Mathematics

Andrey Dmitiev, Biology

Mentor: Michael Model, Ph.D.

*Nucleic Acids Regulate
Intracellular Ions and Membrane
Potential*

The charge of major intracellular inorganic cations (K^+ , Na^+ , and Mg^{2+}) significantly exceeds the combined negative charge on Cl^- and HCO_3^- . This anion gap is balanced by organic anions. Analysis of published data suggests organic phosphorus-containing compounds are responsible for neutralizing much of the anion gap with many being large polymers, including DNA, RNA, or polyphosphate that undergo regular synthesis and degradation. This produces a variable average valency (z) associated with organic anions. Previous results suggest an increase in z leads to membrane hyperpolarization and accumulation of cations, which is supported by this analysis using cellular and computational models. The inhibition of potassium channels is expected to reduce phosphorus uptake through sodium-coupled transporters, suggesting DNA synthesis is accompanied by cell hyperpolarization and requires functional potassium channels.

Sarah Melen, Senior, Biology
Caroline Nitirahardjo,
Graduate Student, Biology

Mentor: Helen Piontkivska, Ph.D.

*Changes in ADAR Editing
Patterns Post-COVID-19 Infection
in Pediatric Patients*

Adenosine deaminases acting on RNA, ADARs, resulting in A to I editing play a key role in gene regulation, have been shown to play a role in the immune response, and have been linked with multiple diseases. Here we explore differences in patterns of ADAR editing between multisystem inflammatory syndrome in children (MIS-C), Kawasaki's disease (KD), and COVID-19, in pediatric patients to determine whether these diseases have distinct editing patterns. Uniquely edited and shared genes have been found between conditions. Interestingly, we also find changes to editing in conditions from controls in a number of pathways, including those related to neurodegenerative diseases and cardiovascular functioning. Delineating these patterns may be critical to disease identification, deciding possible treatment options, and predicting severity of the disease.

Parmeet Multani, Junior,
Chemistry

Mentors: Yaorong Zheng, Ph.D.,
& Wjden Jogadi

*Determination of the Cytotoxicity
Effects of Activatable Platinum
Prodrug in Breast Cancer Cells
Using MTT Assay*

Cancer is the second leading cause of death in the United States. Platinum-based drugs are effective anticancer drugs but are limited in clinical effectiveness due to side effects. This study presents a new design of near-infrared (NIR)-activatable Pt(IV)-based anticancer agents. This Pt (IV) prodrug can be photoactivated by NIR irradiation triggering photoreduction to release the anticancer agents. The efficiency of Pt (IV) prodrug was evaluated via MTT assay by using breast cancer cells. This assay is used to measure the cytotoxic effects of drugs on cell lines. In conclusion, MTT assays and live/dead cell assays showed that the Pt(IV) prodrug exhibited cytotoxicity in breast cancer cells upon irradiation and no cytotoxicity in the dark.

Peighton Neuman, Senior,
Biology

Mentor: Manabu Kurokawa,
Ph.D.

*Mouse Model of Mental and
Intellectual Disorders*

Genetic mutations often account for the risk for mental and intellectual disorders. However, it remains elusive how such mutations affect synaptic networks, leading to these neurodevelopmental disorders. Ubiquitin E3 ligases play essential roles in the regulation of cellular homeostasis and development by controlling protein turnover. Recently, several studies have reported mutations of the Huwe1 gene in patients with a mental disorder. One of such mutations reported by multiple studies is the R4187C mutation (Huwe1R4187C). To investigate the functional significance of Huwe1R4187C, we recently generated Huwe1R4187C knock-in mice in which the wild type Huwe1 gene was replaced with the Huwe1R4187C allele. We will discuss the effects of this mutation at the cellular level as well as at the level of the whole animal.

Thai Ngyuen, Junior, Biology

Mentor: Diana Goncalves
Schmidt, Ph.D.

*Synthesis of New Extracellular
Matrix (ECM) for Mimicking
Glioblastoma Multiforme
(GBM) Cancer Stem Cells (CSCs)
Microenvironments*

Glioblastoma multiforme (GBM) is the most common and most lethal type of brain cancer. Current method of surgical resection, chemotherapy and radiation addresses the bulk of the tumor mass but, they are inefficient as recurrence often occurs 12 months post-operation. We have developed Gold Nanorods (AuNRs) that can locate the cancer stem cells (CSCs) of GBM cells and destroy these cells, through Photo thermolysis, that can potentially prevent reoccurrence of GBM. Our results showed a very promising result in AuNRs uptake by the CSCs and paved ways for more future research.

Veronica Palmer, Senior,
Biology

Mentors: Christine Crish, Ph.D.,
& Sarah Terrill

*Examining the Sex-Dependent
Neuroprotective Effects of Irisin
in an Alzheimer's Mouse Model*

Alzheimer's Disease (AD) is a neurodegenerative disease characterized by memory loss. Symptoms result from neuronal degradation in the brain caused by an abnormal accumulation of proteins. Irisin, a hormone made in response to exercise, has shown therapeutic potential for only female AD mouse models. To study whether female sex hormones mediate the effects of irisin treatment, the ovaries of some female mice were removed while the others had similar surgeries but their ovaries were left intact. After administering irisin treatment, brain tissue was analyzed. It was concluded that in female AD mice with intact ovaries, irisin reduced AD pathology. However, it was ineffective in mice without ovaries. Female sex hormones are necessary for the expression of neuroprotective factors following irisin treatment.

Aakriti Poudel, Senior,
Biotechnology

Brandie Nelson, Graduate
Student, Biology

Katherine Knies, Graduate
Student, Biology

Najmah Al Ramel, Graduate
Student, Biology

Mentors: Jennifer McDonough,
Ph.D., & Brandie Nelson, &
Katherine Knies, & Najmah Al
Ramel

*Understanding BHMT-Betaine
Pathway in Multiple Sclerosis*

Past studies have also shown that mitochondrial dysfunction can play a role in neuropathology in MS. The McDonough lab has previously shown that enhancing the betaine homocysteine methyltransferase (BHMT)-betaine pathway is protective in mouse models of MS, by enhancing mitochondria. We hypothesize that in MS-like pathology, the BHMT-betaine pathway is activated in lesion areas, where it reduces oxidative stress and enhances mitochondria. We studied whether the BHMT-betaine pathway is activated in lesion areas by observing changes in BHMT enzyme concentration and the betaine GABA transporter concentration in two mouse MS models. The experimental autoimmune encephalomyelitis (EAE) and cuprizone models of MS were tested in these experiments.

Autumn Redd, Sophomore,
Neuroscience

Mentor: Lique Coolen, Ph.D.

*Effects of Spinal Cord Injury on
Neuropeptide Expression in LSt
Cells*

This study aims to investigate the effects that spinal cord injury (SCI) has on the expression of neuropeptides, specifically enkephalin, in a population of Lumbar Spinothalamic cells (LSt cells). This population of LSt cells makes up the spinal ejaculation generator (SEG), which is the spinal center that coordinates the reflexes that lead up to ejaculation. This research focuses on localizing opioid receptors in a spinal reflex generator for sexual function in rats using fluorescent in situ hybridization and testing effects of spinal cord injury on receptor gene expression.

Nathan Ritchey, Senior,
Mathematics
Will Dion, Graduate Student,
Biology

Mentor: Bokai Zhu, Ph.D.

*Nuclear Speckle Morphology
Rhythms are Disrupted by
Senescence*

Proteostasis is essential for cellular health and function. As cells permanently exit the cell cycle, a phenomenon known as cellular senescence, proteostasis is disrupted, and the Unfolded Protein Response (UPR) is altered. Our group established 12-hour rhythms of Nuclear Speckle (NS) liquid-liquid phase separation (LLPS) dynamics as essential to proper UPR function. Here, we identified a disruption and lengthening of the ultradian rhythms of NS LLPS dynamics, specifically morphology, in senescent cells. Using time-lapse imaging to track cells over 72 hours and the unbiased Eigenvalue/Pencil matrix decomposition method to identify rhythms, NS sphericity followed an expected (11.7 ± 0.3)-hour rhythm in replicating cell populations and senescent cell NS exhibited longer and more fluctuating (23.5 ± 1.5)-hour rhythms from days eight to fourteen post senescence induction.

Alice Tun, Freshman, Biology

Mentor: Rafaela Takeshita, Ph.D.

Role of DHEAS in Primate Brains

Dehydroepiandrosterone-sulfate (DHEAS) produced in the brain and adrenal gland are associated to brain and cognitive development. Four primates were compared based on the order of evolution: marmosets, macaques, chimpanzees, and humans. The DHEAS levels were indirectly compared between primate brains through gene analysis that codes for the enzyme for DHEAS synthesis. For procedure, reverse transcription and qPCR were performed to reveal that macaques have higher gene expression for DHEAS production than marmosets. The lower DHEAS production in showed showed evidence DHEAS can relate to primate evolution. This showed the molecular mechanisms have changed in human evolution. Thus paves the idea that DHEAS might have a higher influence on human brain evolution than previously believed, making it essential to understand human evolution.

Martin Walschburger-Hurtado, Senior, Biology

Mentor: Paul Bagavandoss, Ph.D.

Susceptibility of Ovarian SKOV3 Ovarian Cancer Cells to Hemp Extracts

In this study, I wanted to examine if hemp extracts, which contain both cannabinoids and terpenoids, could inhibit the proliferation and migration of SKOV3 ovarian cancer cells. The hemp extracts were diluted in the serum-free medium to contain equivalent concentrations of CBD, which had previously been shown to inhibit the SKOV3 cells. Broad-spectrum extracts did not affect the ovarian cancer cells' viability. However, full-spectrum extracts, which contain additional cannabinoids, inhibited the proliferation and migration of cancer cells. Both intracellular and extracellular acidities were increased by the full-spectrum extracts. The results of my study suggest that full-spectrum hemp extracts, which are generally regarded as safe, show potential for future preclinical research by themselves or in combination with other anticancer compounds.

Biology - Ecology

Marcus Amador, Sophomore, Biology

Mentor: David Ward, Ph.D.

The Invasive Phragmites

Phragmites australis is an invasive plant species in Ohio. The regenerative nature of these Phragmites plants and the ability to grow tall and shade out other plants, and take over an environment, replacing the native species makes Phragmites a problem species. Phragmites can reproduce both sexually and vegetatively. Our research aimed to understand how Phragmites responded to rock salt, a known cause of reduced growth near roadways, and nitrogen fertilizer from gardens, which may also reduce its growth. The treatments we applied were rock salt, fertilizer, rock salt with fertilizer, and a control (no rock salt and no fertilizer). We found that, although the treatments were not an important factor, the number of culms that sprouted was larger than the number of rhizomes.

Lukas Capatosto, Junior, Environmental and Conservation Biology

Mentor: Sangeet Lamichhaney, Ph.D.

A Novel Use of Transcriptomics to Recover the Mitogenomes of the Tibetan Partridge

To study altitude adaptations in the Tibetan Partridge (*Perdix hodgsoniae*) we sequenced the genomes of 19 individuals and the transcriptome of 37 individuals of this species. We wanted to use the larger sample size of the combined data to check the phylogenetic relationships of our samples. Using Mitobim software I was able to recover complete mitochondrial genomes for all samples and build a maximum likelihood tree. The phylogenetic relationships showed by the mitogenome tree confirmed those of the genomic tree. We found two clades in the Tibetan Partridges: one contained individuals from the highest and lowest altitudes and the other contained individuals from intermediate elevations. These birds did not cluster by altitude, but by the river valleys they are from.

Alicia Costello, Senior,
Horticulture
Augustin Holman, Senior,
Horticulture
Chris Weeden, Junior,
Horticulture
Jessica Palo, Junior,
Horticulture
Owen Conway, Junior,
Horticulture

Mentor: Sheren Farag, Ph.D.

*Growing Beyond Soil: The
Vital Role of Hydroponics
and Aeroponics in Modern
Agriculture*

This research project aimed to evaluate the effectiveness of indoor growing systems, such as hydroponics and aeroponics, for producing high-quality crops in a controlled environment with reduced resource consumption. The experiment was conducted in a controlled greenhouse, where two different indoor growing systems were set up for comparison. The results showed that both hydroponic and aeroponic systems were effective at producing high-quality crops while requiring significantly less water and fertilizer compared to traditional soil-based farming. These systems offer a promising solution for producing crops in a sustainable and environmentally friendly way, reducing the risk of pests and diseases. However, the initial setup cost of these systems can be expensive, and they require specialized knowledge and equipment for maintenance. In conclusion, this project demonstrated the potential of indoor growing systems such as hydroponics and aeroponics for sustainable horticulture, contributing to a more sustainable food system.

Kendall Ewert, Senior,
Biotechnology

Mentor: David Ward, Ph.D.

*Evaluating Optimal Foraging
Theory in Small Mammals*

Optimal foraging theory states that a forager should choose the food item that provides the greatest nutritional benefit. This study evaluates this theory through presenting small mammals with food sources of varying nutritional compositions and documenting their preferences. To assess preference, we collected giving-up densities (GUDs), indicating the point where foraging stops due to a variety of factors. We compared their preferences to the crude protein, non-structural carbohydrates, tannin, and total polyphenols of each food source. Unexpectedly, food items with the highest content of crude protein or non-structural carbohydrates were not preferred. Additionally, sources with the highest tannin and polyphenol content were not avoided. These findings contradict the optimal foraging theory and provide insight into which food sources are important for herbivore foraging.

“I love to see girls and women indulging in
STEM research, because it gives me not
only a sense of happiness, but also a sense
of pressure to do well because I know that
there are other people out in the world
doing the same.” ~ Autumn Redd

Ryan Fitzpatrick, Junior,
Zoology
Miranda Kissel, Junior,
Zoology

Mentor: David Ward, Ph.D.

*African Mammals Choose the
Road More Traveled*

As anthropogenic features are introduced to South Africa, wild mammal species have begun to adapt to changing landscapes. Features such as power lines and roads provide unique travel corridors that mammal species may not have had in the past. We assessed how mammals utilized linear and nonlinear travel features throughout the woody savannah using trail cameras. We hypothesized that mammal species would utilize the nonlinear travel features such as natural game trails and undisturbed landscapes rather than linear travel patterns such as power lines and roads. We found that carnivores used the linear features as a way to travel than the undisturbed savanna. As anthropogenic features continue to be introduced, our findings suggest that mammal species will continue to adapt to the changing landscapes.

Ellie Freidly, Junior, Zoology
Katelyn Perhacs, Senior,
Biology

Mentor: David Ward, Ph.D.

*The Impact of Predation and
Herd Structure on Impala
Behavior*

Herbivores need to balance foraging and ensure safety from predators. We examined the behavior of adult and juvenile impala in South Africa at Kruger National Park (high predation) and Wits Rural Facility (low predation). We collected data using ethograms to analyze specific impala behaviors such as foraging and vigilance. We predicted herds to be more vigilant in Kruger due to higher predation than in Wits. We hypothesized that in territorial herds (all females with 1 dominant male) the male will be the most vigilant because he will need to guard his females young. Contrastingly, we expected that in bachelor herds (all male) they will only look out for themselves to promote individual survival. Results indicated that dominant impala foraged less and were more vigilant.

“Research is fostering sharing
of data and collaborations.
Scientists are also making great
strides at the interface of biology
and engineering with new
technologies that are laying the
groundwork for future advances”
~ Thomas R Insel

Renae Gizzo, Senior,
Environmental and Conservation
Biology

Grace Michael, Senior,
Geology

Ana Murray, Senior,
Geography

Mentor: Tim Assal, Ph.D.

*Applications of
Dendrochronology: When Did
a Living Forest Become a Ghost
Forest?*

Atlantic White Cedar (*Chamaecyparis thyoides*) dominated swamps are highly ecologically significant, yet sensitive to salinity, thereby the species is an important indicator of rising sea levels. Standing dead trees that have been killed from exposure to saltwater, known as ghost forests, are especially prominent in Atlantic White Cedar (AWC) marshes due to their ability to remain upright for extended periods of time. In recent years, it has been hypothesized that Hurricane Sandy contributed to a large wave of tree mortality in New Jersey coastal ecosystems. This research is supporting a broader question that seeks to quantify the current extent of ghost forests in the southern New Jersey freshwater-marsh ecotone. In our study, we utilized AWC tree cores collected in 2021 to develop a completely open-source workflow. Our primary objective was to measure the annual ring widths of each core, develop a tree ring chronology across sites, and examine the validity of cross-dating methods in application to AWC. Few studies have cross-dated AWC tree cores and none of them have utilized the methods we conducted. If we are successful, our results will provide another line of evidence of hurricane induced ghost forest formation.

Svea Hall, Senior, Biology
Julia Coyle, Senior, Biology

Mentor: David Ward, Ph.D.

*Ecosystem Engineers: How
Termite Mounds Act as Islands
of Fertility in the South African
Woody Savanna*

Termite mounds are believed to be correlated with increased plant diversity and abundance, possibly caused by the amount of bacteria and nutrients that they introduce into the soil. Our objective was to study the effects that termite mounds had on the surrounding soil characteristics and plant diversity/abundance in the woody savannas of Acornhoek, South Africa. We expected to find that plots closer to mounds would have the highest plant diversity, plant abundance, and soil respiration (caused by microbial activity); and that this functional diversity would decrease with distance away from a mound. Focusing on soil composition and plant diversity, we studied 15 mounds and collected various data points to test our hypothesis.

Cameron Jones, Senior,
Biology

Abigail Rec, Biology

Mentors: Lauren Kinsman-
Costello, Ph.D., & Abigail Rec

*Nutrient Limitations of Primary
Producers in Arctic Streams*

Algae and primary producers in freshwater ecosystems are limited in growth by the availability of nutrients such as P and N. Characterizing the abundance and spatial distribution of these nutrients is thus paramount in understanding the foundation of freshwater ecosystems. A goal of our Nutrient Diffusion Substrate experiments is to identify the nutrient makeup of Arctic streams while challenging the long-held paradigm that P is the main limiting factor in primary producer growth. To accomplish this, several Arctic watersheds were selected and NDS deployed with treatments of N, P and an N P mixture. We identified that Arctic freshwater systems were co-limited by P and N. We also collected NDS data from 2019 to 2022 to examine how permafrost melt impacts nutrient composition over time.

Félix Látimer, Junior,
Environmental and Conservation
Biology

Mentors: Andrea Case, Ph.D., &
Christopher Blackwood, Ph.D.

*Lobelia Presence Analysis Using
Geographic Information Science*

Factually sound biological collections serve as the bases for any biotic scientific research. Assuming specimens are properly cataloged biological collections afford scientific discoveries. During the 2022 SURE program Félix Látimer, an Environmental and Conservation Biology major, worked for plant biologist Dr. Andrea Case. Félix analyzed digitized Lobelia herbarium specimen data. The Lobelia project used data from the Biota of North America Program (BONAP) and the SouthEast Regional Network of Expertise and Collections (SERNEC). The datasets' authentication was conducted using geographic information science (GIS). Over the course of eight weeks the documented county presence of the twenty-three North American native Lobelia species were mapped in ArcGIS Pro. Once the mapped layers were corrected their original datasets were updated, improving one aspect of biological collections' accuracy.

Alyssa Lortie, Senior,
Environmental Studies
Kamryn Hornacek, Junior,
Environmental Studies

Mentors: David Ward, Ph.D.,
& Matthew Wuensch, & Taylor
Michael

*Elephant Foraging Destroys
Vegetation in African Savannas*

Elephant (*Loxodonta africana*) foraging has been noted as one of the main sources of defoliation in Africa. Elephants have been shown to prefer specific plant species. We investigated the destruction of two highly preferred species: mountain aloe (*Aloe marlothii*) and marula trees (*Sclerocarya birrea*). We studied both plant species at three adjacent sites: 1. No elephant presence, 2. Where elephants entered for a month due to a drought seven years ago, 3. Constant elephant presence. Our results indicate that elephants have strong preference for both plant species. We found that marula trees were heavily damaged and there was a complete absence of aloe plants with elephants. This destruction leads to the loss of habitat for many other species which could ultimately lead to ecosystem collapses.

“Youth can study biology and
ecology by testing the water in their
own community; or learn about
statistics, calculating the food supply
and usage at the local food bank”
~ Craig Kielburger

JB Mason, Sophomore,
Horticulture
Alicia Costello, Senior,
Horticulture
Augustin Holman, Senior,
Horticulture
Chris Weeden, Junior,
Horticulture
Jessica Palo, Junior,
Horticulture
Nathan Schmidt, Junior,
Horticulture

Mentor: Sheren Farag, Ph.D.

*Exploring the Arboreal
Landscape of Kent State - Salem
Campus: Identify Common
Tree Species and Reap Their
Environmental and Mental
Health Benefits with Horticulture
Skills!*

The horticulture program students at Salem Campus conducted a research study to create an inventory of the common tree species present on campus and improve their tree identification skills. The students used a variety of tools to accurately identify each tree species and record their location on campus. The students found that the most common tree species on Salem Campus were oaks, maples, flowering dogwood, American linden, and river birch. They also discovered several less common species, such as the Yellow Buckeye, Grey Elder, and Oregon Crab Apple. Through their research, the students developed a comprehensive tree inventory list, which will serve as a valuable resource for future maintenance and planting efforts on campus. Moreover, the students explored the social and personal benefits of trees on campus and found that the presence of trees had a positive impact on the mental and physical health of the students and staff, as well as on the overall aesthetic appeal of the campus. By understanding the environmental impact and personal benefits of trees, the Salem Campus community can better appreciate and care for the trees on campus and make informed decisions about future planting and maintenance efforts. Overall, this study highlights the importance of creating a tree inventory and developing skills in tree identification for the maintenance and preservation of the campus environment.

Maya Niesz Kutch, Senior,
Botany

Mentor: Christopher Blackwood,
Ph.D.

*Evaluating the Differences
between Fungal Soil Databases
with Guild Assignments and
Trends*

There are multiple novel fungal DNA traits and guild databases for use in assigning important functional information to fungal sequence data. A comparison of these databases has not been done specifically for soil fungi. Mycorrhizal associations are symbiotic relationships between tree species and fungi, and each species is obligate with a certain mycorrhizal type. This study investigates how a selection of these databases, FUNGuild, FungalTraits, and FunFun, differ in their guild assignments through the lens of trends between forest plots of different tree mycorrhizal types. Here, we conclude that use of the newer database, FungalTraits, consistently strengthens previously found trends in the effects of mycorrhizal type on soil fungal communities compared to FUNGuild.

Paulo Recser, Senior,
Environmental and Conservation
Biology

Mentors: Christopher
Blackwood, Ph.D., & Andrew
Eagar, Ph.D.

*Differential Tree Root Species
Identification through DNA
Extraction, psbA3-f and trnHF
Restriction Length Fragment
Polymorphism Analysis.*

Tree root proliferation is hypothesized to be affected by soil properties and biogeochemical nutrient cycling, as well as tree species traits such as mycorrhizal type. To identify tree roots by species, extraction of root DNA is first needed, followed by PCR-amplification of a species barcoding gene. We applied restriction enzymes to fragment the PCR amplicons and detect species-identifying polymorphisms. Once DNA fragments were separated, software applications were applied to confirm species differentiation through cluster analysis. Preliminary results reveal our methods using a single restriction enzyme can differentiate some species at our site. Future application of additional enzymes to produce additional fragmentation of our root PCR amplicons may yield further improvements in species differentiation.

Caitlyn Skilton, Senior,
Zoology

Mentor: Mark Kershner, Ph.D.

*Analysis of Feeding Behaviors
and Interactions of Three
Hummingbird Species in West
Texas*

Hummingbird behavior is driven by high metabolic rates, frequent feeding, and environmental factors. My project focuses on feeding and behavioral interactions of three hummingbird species in Texas, (Broad-tailed Hummingbird, Rufous Hummingbird, Black-chinned Hummingbird). To determine how time of day, weather, and species interactions affect hummingbird feeding, I collected data using Cornell's live hummingbird feeder camera. During morning, mid-day, and evening intervals, I recorded air temperature, precipitation, hummingbird counts by species and sex, and behavioral interactions. Overall, hummingbirds were most active during morning with differences among species/sexes. Further, hummingbird activity was significantly lower when raining, and temperature also influenced feeding. When different species or sexes perched near each other, aggressive interactions increased. These results increase our understanding of hummingbird behavior, ultimately proving useful in conservation efforts.

Hanna Smith, Senior, Biology
Megan Collins, Junior,
Environmental and Conservation
Biology

Mentor: David Ward, Ph.D.

*Bugging Each Other – Gall-
Making Wasp Selection and
Parasitism on Terminalia Sericea*

Galling wasps in the African savanna prefer the Silver Leaf tree as their host. The main objective of this study was to relate tree distribution and age to gall abundance. Secondly, we aimed to identify galling species, investigate their interspecific relations, and compared alpha and beta diversity. We compared the distribution of galls to study their relationships to tree age, height and position. We collected and dissected several wasp galls. We expect that the galling wasps prefer newer growth of the trees. We found two species of wasps ovipositing based on morphological and locational differences. We believe that tree health, soil fertility and competition between galls should be areas of future research.

Natalie Taylor, Senior, Zoology

Mentors: Sangeet Lamichhaney,
Ph.D., & Catalina Palacios

*Collecting Non-Migratory Birds
and Tissue Samples for Research*

Many species of birds are non-migratory and stay within their general habitat year-round, for example, here in Northern Ohio. As part of a larger study that is focused on changes in RNA expression as a response to environmental changes throughout the seasons, I aided in both field and lab work which were conducted to catch target bird species and retrieve each of their tissues and carcass.

Kori Tombaugh, Sophomore,
Environmental and Conservation
Biology

Brandon Smith, Sophomore,
Zoology

Mentor: David Ward, Ph.D.

*Vervet Monkeys in a Vertical
Landscape of Fear*

In a landscape of fear, prey species do not perceive threats equally depending on differing levels of severity. Vervet monkeys experience threats from aerial, arboreal, and terrestrial predators in southern Africa. We tested the response of vervet monkeys to the alarm calls of leopards, crowned eagles, wild dogs, and hyenas. Using ethograms, we quantified the troop behaviors in response to these calls. Vervet monkeys responded to aerial predators by moving to the center of the tree and the dominant male would act as a sentinel. For arboreal predators, vervets would spread out among the branches of the tree. In response to terrestrial predators, vervets would seek an elevated position. This gives additional insight into how vervet monkeys communicate and respond to threats within their troop.

Grace Watson, Junior,
Environmental and Conservation
Biology

Michael Back, Ph.D. Student,
Biology

Erica Horton, Environmental
and Conservation Biology

Mentor: Lauren Kinsman-
Costello, Ph.D.

*Phosphorus in Coastal Wetland
Vegetation Patches*

Wetlands can regulate nutrient fluxes between the terrestrial land and a body of water. An overabundance of nutrients, such as phosphate, can lead to harmful algal blooms (HABs), which can deplete oxygen from aquatic ecosystems and produce toxins. Our goal was to determine concentrations of bioavailable soil and surface water phosphorus in contrasting vegetation patches, measured as soluble reactive phosphate (SRP). We sampled from Turtle Creek Bay, located in Magee Marsh Wildlife Area, Ohio, where we identified four vegetation patch types: grasses, hardwoods, typha (cattail), and submerged aquatic vegetation (SAV). The SAV patch exhibited significantly less SRP than the other patches ($p < 0.05$). However, there was no significant difference between surface water and sediment SRP for other patches or between sampling dates.

Biomedical Sciences

MB Berry, Senior, Biology

Mentor: Wilson Chung, Ph.D.

*Mild Blast Traumatic Brain Injury
on Stress Function in a Preclinical
Model*

Traumatic brain injury (TBI) is a major source of morbidity and mortality in the civilian and military populations. One form of TBI is mild blast-induced (mb)TBIs which is due to blast waves emanating from explosive devices. mbTBI survivors experience debilitating clinical disorders that involve abnormal stress-axis function, such as posttraumatic stress disorder (PTSD). To date, preclinical studies showed that pre-exposure of mbTBI disrupts stress-axis activity and promotes anxiety-like behaviors. Therefore, using preclinical studies in TdTomato mice, we asked whether mbTBI exposure acts directly on neurons that control the stress-axis in corticotropin-releasing hormone. We measured vasopressin expression in hypothalamic CRH neurons to analyze whether these neurons respond to mbTBI. We will present data that may help clarify our understanding of how mbTBI promotes stress-related disorders.

Kayleigh Bucci, Junior, Biology
Hannah Zuppe, Graduate
Student, Biology

Mentor: Manabu Kurokawa,
Ph.D.

*Role of CD36 in Breast Cancer
Drug Resistance*

About 20% of breast cancer is categorized as a subtype called “HER2-positive breast cancer” because the proliferation of this type of breast cancer is driven by the oncogene HER2. Inhibition of HER2 can specifically kill HER2-positive breast cancer cells. For instance, lapatinib is a small molecule inhibitor of HER2 that is FDA approved and clinically used to treat patients with HER2 positive breast cancer. However, it has been shown that the cancer cells eventually acquire resistance to lapatinib. The Kurokawa lab previously demonstrated that the fatty acid transporter CD36 plays a key role in resistance to HER2 inhibitors. Here, we show the effects of CD36 knockdown in sensitivity of cancer cells to lapatinib and neratinib treatment in vitro and in vivo.

Joshua Comport, Senior,
Neuroscience

Mentor: Wilson Chung, Ph.D.

*Consequences of Cyanobacterial
Harmful Algae Toxins on Glial
Cells in Murine Brain*

Worldwide, an increased presence of cyanobacterial harmful algal blooms (cyanoHABs) have been detected in freshwaters. CyanoHABs release hazardous cyanotoxins, mainly microcystins (MCs) and are predicted to expand in freshwater based on current climate models, accidental and long-term exposure to cyanotoxins is almost inevitable. Therefore, it is urgent to understand the physiological consequences of cyanotoxin exposure. Male mice were fed with water vehicle or MC-LR (50 µg/kg bw), the most toxic MC isoform, every other day for 21 days. Brain tissue was processed for GFAP and IBA-1 immunohistochemistry to visualize astrocytes and microglia, respectively, in order to evaluate the consequences of MC-LR ingestions on glial cells found in the cortex, corpus callosum and hippocampus.

Kendra Dillon, Sophomore,
Neuroscience
Dayanara Lohr, Ph.D. student,
Neuroscience

Mentor: Aleisha Moore, Ph.D.

*Investigating Whether the Loss
of Progesterone Receptors in
KNDy Cells is Sufficient to Mimic
Reproductive Dysfunction in
PCOS*

Polycystic ovary syndrome (PCOS), the leading cause of female infertility, is characterized by raised luteinizing hormone (LH) pulsatility driven by impaired hypothalamic gonadotropin-releasing hormone (GnRH) neuron regulation. GnRH neurons are regulated by cells co-expressing kisspeptin, neurokinin B, and dynorphin (KNDy neurons) which act as the GnRH/LH pulse generator. The Moore laboratory previously identified that PCOS-like mouse display decreased progesterone receptor (PR) expression in KNDy neurons. To investigate if this is sufficient to induce the PCOS phenotype, we utilized female mice with PRs knocked out from kisspeptin neurons. We used in situ hybridization to determine changes in KNDy peptide expression. Preliminary data indicates that although KNDy peptide expression was not significantly altered between groups, mice lacking PRs in KNDy neurons experienced decreased fertility compared to WT controls. Therefore, the mechanism by which the loss of PR in KNDy cells leads to infertility requires further investigation.

Caden Hearn, Senior,
Neuroscience

Mentor: Derek Damron, Ph.D.

*Effects of Fentanyl and
D-Cysteine Ethyl Ester On
Calcium Dynamics In Cultured
Hippocampal Neurons*

The opioid epidemic is a major health crisis in the U.S. Overdose results in Opioid-Induced Respiratory Depression (OIRD) often treated by administration of competitive opioid receptor antagonists such as naloxone. D-cysteine ethyl ester (D-CYSee) has been shown to prevent OIRD and disrupt the acquisition of fentanyl-induced seeking behaviors in rats. The Hippocampus has been established as a vital region for the encoding of drug-associated cues and contexts. We assessed the effects of D-CYSee and fentanyl on intrinsic calcium activity in heterogeneous cell cultures derived from the hippocampus of P0 Sprague Dawley rat pups. We assessed changes in intrinsic intracellular Ca^{2+} activity under fentanyl(10nM), D-CYSee(10uM), or D-CYSee(10uM) + fentanyl(10nM). Neurons and astrocytes were identified using live cell fluorescent probes NeuO and Sr101.

Guensu Jang, Senior, Biology
Roman Giacomino, Junior,
Biology
Dinah Walter, Senior, Biology

Mentor: Colleen Novak, Ph.D.

*Mouse Muscle Thermogenesis
in Response to Predator Odors:
Influence of Repeated Exposure
of Specific Predator Odor*

Over a four-week period, 16 male and female FVB transgenic mice were exposed to three types of predator odor (PO)—ferret, cat, and rat—and a control odor. The bedding or fur of each predator was placed inside of each mouse's home cage. During periods of exposure, skeletal muscle activation was assessed. We found that ferret odor was associated with significantly greater skeletal muscle thermogenesis compared to control odor, while cat and rat odors had a smaller effect that did not differ from control. All odors caused an increase in skeletal muscle thermogenesis, but ferret odor caused the greatest increase, while control odor caused only a minimal increase. These results suggest that ferret odor plays an important role in skeletal muscle activation for mice.

Dinah Walter, Senior, Biology
Roman Giacomino, Junior,
Biology
Guensu Jang, Senior, Biology

Mentor: Colleen Novak, Ph.D.

*Mouse Muscle Thermogenesis
in Response to Predator Odors:
Significance of Ferret Odor in
Comparison to Other Predators*

Prey animals such as mice experience an immediate change in their muscle when exposed to predator odors, which will lead to muscle thermogenesis. However, which predator odor will provoke the greatest change in the temperature of the mouse muscle? Repeated exposure to a specific predator odor can lead to less thermogenesis, which means mice can adapt to a stimulus, slowly showing less response to the odor. After three trials of exposure to cat fur, rat, and ferret bedding odor experiment, cat fur was the only odor to show diminished peak temperature after repeated exposure. Whereas the response to ferret or rat odors remains elevated after multiple exposures, the response to cat odor over repeated exposure resembled the response to the control stimulus where the thermogenesis decreased with each exposure. Rat and ferret bedding were able to provoke an innate anti-predator physiological response in mice, unlike cat fur, which showed limited effectiveness.

Andrew Whitfield, Junior,
Biology
Sandeep Kaur, Ph.D. Student,
Biology

Mentor: Manabu Kurokawa,
Ph.D.

*Regulation of $\Delta Np63$ by the E3
Ligase HUWE1 in Keratinocytes*

The p53 family proteins (p53, p63, and p73) are a group of transcription factors that play a crucial role in cellular homeostasis and development. Among the family members, p63 is known to regulate the proliferation of basal epidermal cells. Importantly, compared to p53, how p63 protein is regulated remains poorly understood. The Kurokawa lab has recently discovered that an E3 ubiquitin ligase HUWE1 negatively regulates p63 protein by promoting its degradation. To investigate a role of HUWE1-mediated p63 regulation in vivo, we generated keratinocyte-specific Huwe1 KO mice. Here, we will discuss their phenotype.

Chemistry/Physics

Paul Fleischer, Junior, Physics
Darion Feldt, Senior, Physics
Isabella Dibra, Sophomore,
Applied Engineering
Samuel Bartholomew,
Junior, Physics
Colin Green, Graduate
Student, Physics

Mentor: Robert Polak, Ph.D.

*Modeling Disruptions in an
Aquatic Electric Barrier*

The Chicago Area Waterways System (CAWS) connects the Great Lakes basin to the Mississippi River basin for the transport of bulk goods. An aquatic electric barrier is present in the CAWS to prevent invasive species from passing between the two basins. This barrier has been effective in preventing the spread of Asian Carp into the Great Lakes basin, however commercial traffic through the CAWS may create voids in the electric barrier. This may limit its effectiveness, allowing invasive species to pass. We are studying the electric barrier by utilizing computer simulations and physical models to identify possible voids caused by commercial traffic with preliminary results presented here.

Delonte Goodman, Senior,
Mechatronics Engineering

Mentor: Antal Jakali, Ph.D.

*Organic Electrochemical
Transistors (OECTs) as Liquid
Electrolytes and Implementation
of Metals Salts*

The study was focused on investigating the influence and comparison of different metal salts in the creation of liquid electrolytes as Organic Electrolytes Chemical Transistors (OECTs). The effect of various metal salts such as LiTFSI, Mg(TFSI)₂, and Al(TFSI)₃ (bis-trifluoromethane sulfonyl imide) were measured and analyzed in regard to the electrical characteristics of the fabricated OECTs. The conducted experiments used different metal salts with different ratio sizes/valency cations. During the investigation, cations were varied utilizing Lithium, Magnesium, and Aluminum metals salts. In addition to varying metal salts sulfonates such as Chloroform (CHCl₃) and Tetrahydrofuran (C₄H₈O) were implemented to facilitate the creation of ionic liquid. Electrical characteristics such as transient measurements and steady-state measurements. Finally, the On and Off Ratio and Switching Times were compared between the three samples.

Garrett Hartley, Senior,
Physics

Mentor: John West, Ph.D.

*The Development of Stressed
PDLC Cells*

Liquid crystals are an exciting material existing between solid and liquid states and come with a series of interesting properties. One specifically is the ability to change refractive index when exposed to an electric field. This property allows for the creation of glasses lenses that can change focal distance at will. This is achieved by trapping a small amount of E7 pneumatic liquid crystal and UV polymer between two glass planes coated with electrodes and squeezing (stressing) it slowly. The stressing action is needed to create long polymer chains that trap the liquid crystals in elliptical shapes. The slow squeezing motion was made possible by the development of a small device which was the focus of this research.

Holly Matthews, Senior,
Physics

Mentor: Thorsten-Lars Schmidt,
Ph.D.

*Design of DNA Support
Structures for Membrane Protein
Imaging*

Protein misfolding could be involved in up to half of all human diseases. Experimentally determining the structure of these proteins is essential to the study and treatment of such diseases. A promising approach is the isolation and imaging of membrane proteins in artificial lipid-bilayer nanodiscs. To better capture, stabilize, and orient these nanodiscs for cryo-electron microscopy, a nanoscale DNA origami support structure was designed. DNA origami is a method of folding a long single-stranded DNA into engineered shapes using short DNA oligonucleotides. Here, we design, simulate, and experimentally test a DNA origami support structure for membrane protein imaging. The results show favorable stability in simulations and promising self-assembly during experimental testing. Further studies will continue to optimize the support structure. The ability to build a nanoscale support structure to capture nanodiscs is relevant to the development of an imaging method that could allow 3D reconstruction of essential membrane protein structures.

Victoria Menches, Senior,
Chemistry

Julia Sterbenz, Senior, Pre-
Medicine/Pre-Osteotherapy

Mentors: Farid Fouad, Ph.D., &
Magdy Ibrahim, & Haitham Kalil

*Synthesis of Unsymmetrical
Diaryl Selenides for Sensitive
Electrocatalytic Detection of
Peroxynitrite (PON): Effect of
Substituent on PON Detection
Sensitivity*

Peroxynitrite (PON), is a member of the nitroxidative array of reactive metabolites. Early reports emphasized the deleterious physiological reactivity of PON, but recent investigations show its protective roles. Diaryl selenides grafted on graphite electrodes act as catalytic mediators for the oxidative detection of PON. We tested how the organic substituents on the diaryl selenide affect sensitivity. We present the syntheses of unsymmetrical diaryl selenides with a 4-amino group on one side of the diaryl moiety, and another organic substituent on the other side. Electrodes with our synthesized selenides successfully detect micromolar concentrations of peroxynitrite but with varying sensitivities. Electron-donating substituent negatively affect detection, while electron-withdrawing groups enhance detection. Potential mechanistic routes for detection of PON in light of this work will be presented and discussed.

Kylie Merkel, Junior, Physics

Mentor: Hamza Balci, Ph.D.

*Study of Binding Frequencies of
Telomeric Overhangs at Different
Salt Concentrations*

The research that I conducted was on the binding frequencies of telomeric overhangs at varying salt concentrations and binding sites. At the end of a human chromosome, there is a section of single-stranded DNA that consists of many repeats of the base pairs GGGTTA. These repeats are then able to fold onto themselves to form secondary structures. The telomeric overhang is a vulnerable location, and increased activity is seen in this area when an individual has cancer. The theory behind my research is that as the number of binding sites and the salt concentration both increase, the number of bindings that we see would also increase. To test our theory, we varied the salt concentrations of 12 different strands that had secondary structures.

Turaba Rahman, Sophomore,
Physics

Mojtaba Rajabi, Graduate
Student, Physics

Mentor: Oleg Lavrentovich, Ph.D.

*Substrate Polarity and Electric
Field Affecting Capillary Flow
of Ferroelectric Nematic Liquid
Crystal*

In the experiment, we construct thin sandwich cells with two glass substrates, coated with buffed layers of polyimide PI2555, which sets a polar direction in the plane of the substrate. The cell thickness is around 1 μm . We explore the capillary flow patterns of the ferroelectric nematic placed at the open edge of the cell. We measure the flow speed of the ferroelectric nematic as a function of the rubbing direction and the strength of the applied electric field. The results show that the flow speeds from parallel and antiparallel rubbing directions through normal capillary filling differ by 2%, whereas the flow speeds from parallel rubbing direction in the presence of an applied electric field of 120 V differ by 6%.

Julia Sterbenz, Senior, Pre-Medicine/Pre-Osteotherapy
Victoria Menches, Senior, Chemistry

Mentor: Farid Fouad, Ph.D.

*Sensitive Electrocatalytic
Detection of Peroxynitrite Using
Selenium Decorated Graphite
Electrodes*

We have crafted functional thin film materials by grafting aminophenyl aryl selenides on graphite electrodes. The collective results of previous work generated a hypothesis that the electronic properties of the substituents positioned para to the selenium atom affect the catalytic turnover, and thus the catalytic efficiency, of peroxynitrite (PON) determination on the modified electrodes. We designed and carried out the syntheses of unsymmetrical diaryl selenides functionalized with 4-amino group on one para side of the selenium atom, and another organic substituent with varying electronic properties on the other side of the diaryl selenide. In this work we show how the three substituents that span a range of electronic properties from electron-withdrawing to electron-donating ability gradually affect the sensitivity of modified electrodes in PON electrocatalytic detection.

Rebecca Stratton, College Credit Plus, Chemistry

Mentor: Hao Shen, Ph.D.

*Visualizing In Situ Catalysis on
TiO₂ Nanoparticles*

Nanocatalysts have an array of versatile applications, including in the fields of chemical engineering, bioremediation, and energy storage. Catalysts increase the rate of chemical reactions significantly, lowering the standard free energy of activation for a given mechanism. TiO₂ is a uniquely useful synthetic nanocatalyst due to its high stability, relatively low cost, and excellent surface activity. However, many of the chemical details of catalysis are unclear, including those pertaining to the relationship between structure and activity. Using collected data, a conclusion can be drawn that catalytic activity of TiO₂ nanocatalysts is increased when surface defects are created via reduction. Overall, the use of imaging techniques to explore the defect to activity relationship is vitally important for optimizing the TiO₂ nanocatalyst's efficiency on an industrial scale.

Ronan Waroquet, Senior, Applied Mathematics

Mentors: Antal Jakli, Ph.D., & Kelum Perera

*Electrically Tunable Liquid Crystal
Lenses*

Ferroelectric liquid crystals are a type of liquid crystal in which they are influenced by the presence of voltage. Most liquid crystals only exist in this state in non-room temperature environments. Our research aims to study and construct a room temperature optical lens utilizing these liquid crystals. Traditional and modern multi-lens optics may vary their focal length by an intricate translation of their lenses. Our liquid crystal lens mixture, under the influence of a tunable electric field, was able to achieve this occurrence in a room temperature environment with a singular rather than a multiple lens construction. These lenses may significantly alter the optical industry potentially providing additional insight and data in constructing more cost-efficient, applicable, cheaper, and compact lenses in the optical industry.

English/Languages/Communication/ Geology/Geography/Political Science/ History

Alexandra Bathrick, Junior,
Classics

Mentor: Emily Metzgar, Ph.D.

Opening Pandora's Box

This project attempted to answer the question of how the Roman poet Ovid's *Ars Amatoria* would be perceived in the contemporary environment, specifically due to the views towards women that Ovid expresses. The author read the work in its original Latin as well as in translation and conducted a literature review for reference to the poet and his work. After conclusions pointed towards mixed interpretations, the author went on to speculate about how modern audiences would perceive the myths and realities of Classical Rome and Greece. Due to the advanced level of reading ability and comprehension required in Classics, the author found a new goal: to make Classics more accessible to the everyday, modern audience. The result was a podcast: *Pandora's Vox*, in which the author uses the voice of the mythical Pandora to share Greco-Roman mythology and history to educate and entertain the modern audience.

Annika Dudik, Senior, Geology

Mentor: Anne Jefferson, Ph.D.

*Plastic Distribution and
Degradation in the Urban Fluvial
Environment*

Plastic pollution is an issue in the fluvial environment, where many plastics are transported. Understanding the distribution of plastics can help locate hotspots and potentially abate them before causing harm. The goal of this research was to analyze the distribution of plastic along a stream and its floodplain. We hypothesized that there would be a relationship between the plastic hotspots on the surface and the abundance of microplastics in the underlying sediment. Data shows a higher concentration of litter on the floodplain compared to the stream channel. This implies that floodplains are an important storage zone, though more research is needed to constrain the movement of plastics into and out of this zone. The microplastics data shows no spatial correlation between surface plastics and microplastics.

"Talking to other researchers, learning about their experiences, and being able to integrate that into my own work has also been instrumental as a professional. Collaboration, I learned, is crucial. Even though I was doing my own research project, it did not mean I was working by myself." ~ Kaitlyn Engelhart

Holly Grimm, Junior,
Medical Technology

Mentors: Carrie Schweitzer,
Ph.D., & Rodney Feldmann, Ph.D.

*Comparing and Contrasting
Claws, Mouthparts, Cuticle, and
Environment of Modern and
Fossil Crabs*

Chaceon is a genus of crab (*Brachyura*) whose earliest record is in the Oligocene. There are over 40 modern and fossil species, of which the majority are modern. Over its time span, morphological and ecological changes have occurred. *Chaceon* has progressively moved into cooler and deeper water. The fossil species lived mostly in shallow marine waters, but the modern species have been observed to be up to 2243 m, with an average depth of 926 m. The estimated depth of fossil species is inferred from sediment types and paleogeographic position. The changes in bathymetric and thermal settings were accompanied by morphological variations, particularly related to feeding structures.

Ashley McCormick, Senior,
English

Mentor: Vera Camden, Ph.D.

*Anna Freud: A Life Through
Letters*

Anna Freud developed key concepts relating to the treatment of children that would then define the field of child psychoanalysis. In 1946, Freud directed her friends the Katans to Cleveland, establishing a connection between her work and the Midwest. The ideas of her work remain useful today as the treatment models she used to help children once again are relevant in our post-pandemic era's mental health crisis. Through closely examining letters from the Library of Congress and the Hanna Perkins Center, this research considers the legacy of Anna Freud's ideas and their new life today as we need her insights to help children thrive after the pandemic.

Evelynne Morgan, Junior,
Biology

Caroline Nitirahardjo,
Graduate Student, Biology

Mentor: Helen Piontkivska, Ph.D.

*The Impact of Misinformation,
Disinformation, and Propaganda
on Twitter Users by Comparing
the Usage of Russian Derived
and Ukrainian Derived Words*

Social media allows 4 billion users to share and access information at unprecedented speeds, but this has created an environment conducive to the spread of misinformation, disinformation, and propaganda. To understand the impact of misinformation, disinformation, and propaganda on user sentiment, Twitter API and Google Trends were used on keywords related to the war in Ukraine. User sentiments can be partially inferred through their usage of Ukrainian-derived or Russian-derived spelling of words, such as Kyiv and Kiev. We used Google Trend's R package, gtrendsR, to compare the usage of these spellings. The comparisons were mapped within the US and global countries, providing possible sentiments on the war. Such information may provide links to how the interpretation of information may be tied to socio-economic factors.

"You have to always come in with an open
mind ready for change, ready for adaptation
in order to make it to opening night with a
wonderful show." ~ Alexandra Baxter

Anastasia Simms, Senior,
English

Mentor: Jeanne Smith

*International and Multilingual
Graduate Writer Satisfaction with
Writing Center Sessions*

The writing center field is interested in researching how identity impacts writers' experiences, particularly for historically othered students, to discover new ways to improve practices for inclusivity. The present study aims to discover which aspects of KSU Writing Commons experiences impact international and multilingual graduate writers' perceptions of satisfaction with their sessions. Participants will be sent surveys about their Writing Commons experiences, asked to rate their satisfaction with aspects of them on a one-to-five Likert scale, and provide detail about their most and least satisfying experiences. Their responses will be analyzed for common themes. The current hypothesis expects their responses will demonstrate the most satisfaction with empathetic practices. The study results will help guide future practice to better accommodate a wide variety of writers.

Naidi Valverde-Romero,
Senior, Global Studies

Mentor: Sara Koopman, Ph.D.

Accompaniment in Colombia

In 2002 the peace community of San José de Apartadóm, Colombia asked The Fellowship of Reconciliation Peace Presence to accompany them to deter attacks. Over 50 accompaniers served in this community and surrounding communities. The accompaniers came from North America and Europe. Many of them kept blogs to document their work and experiences. This archive was set up to record and allow for the study of their blogs. It is sorted into several categories, by blog content and author. These blogs provide a better understanding of accompaniment and its effects. One can attempt to understand these experiences through the lenses of gender, race and geography. As the situation continues to evolve, the perspective of these early accompaniers provides ways to improve accompaniment for the future.

Exercise Science/Nursing and Allied Health

Katlynn Brown, Senior,
Respiratory Care

Maria Miller, Senior,
Respiratory Care

Mentor: Megan Alicea

*Factors Influencing Perceived
Effectiveness of Teaching,
Supervising, and Evaluating
Respiratory Therapy Students in
the Clinical Setting*

Background: Clinical experiences are important in health care education. Several studies explore respiratory therapy student perceptions of the clinical experience, but a dearth of evidence exists on clinical instructors' experiences. Purpose: This qualitative study will explore clinical instructor experiences for an in-depth understanding of factors influencing the effectiveness of teaching, supervising, and evaluating respiratory therapy students in clinical settings. Methods: An open-ended questionnaire was created for clinical instructors to detail successful and unsuccessful examples of their experiences with respiratory therapy students. This study will seek to answer how clinical instructors perceive teaching, supervising, and evaluating respiratory therapy students in the clinical setting and what forces influence the perceived ability to effectively teach, supervise, and evaluate respiratory therapy students in the clinical setting?

Lauren Brown, Junior, Exercise Science
Danielle Gallant, Senior, Exercise Science
Keeyanna Curley, Senior, Exercise Science
Shikha Patel, Senior, Exercise Science

Mentor: Angela Ridgel, Ph.D.

*Resistance and Rider
Performance During Dynamic
Cycling*

The purpose of this study was to determine how resistance settings on a motorized stationary cycle affect rider performance in young adults. 18 healthy young individuals (25.4 ± 3.4 years) performed 3 minutes of motorized cycling at different resistance settings (1–10). Heart rate (bpm) and power (W) were measured every second. There were significant increases in power ($p=0.000$, $F=176.176$, $df=9$) and HR ($p<0.001$, $F=123.721$, $df=9$) from setting 1 to 10. Average power ranged from 27.5 ± 12.3 W to 36.1 ± 12.3 W, and average heart rates were 100.8 ± 16.0 bpm and 112.0 ± 19.4 bpm. These findings show that heart rate and power increase with increasing resistance.

Briana Hawkins, Sophomore, Nursing

Mentor: Lisa Mittas, MSN, RN

*Decreasing Urinary Tract
Infections in Healthcare Settings*

There are many infections that patients can acquire while they are admitted to a healthcare facility. UTIs are the most common hospital-acquired infection (HAI), accounting for more than 40% of all infections. A urinary tract infection is an infection within the urinary system. This can include the kidneys, the ureters, the bladder, or the urethra. The majority of these infections are considered CAUTIs, which are catheter-associated urinary tract infections. These types of UTIs develop when there is a lack of care for catheters inserted into the urethra. The objective of my research is to look at why UTIs are the leading infection within a healthcare facility and how we can decrease them.

“If you have a passion for research, you will get deeply involved in the research topic you study. If you have that passion and you strive for it, you will go above and beyond in your field of study.” ~ Wayne Nieh

Brian Johnson, Junior, Public Health

Mentor: Adam Jajtner, Ph.D.

Changes in the Internal to External Workload Ratios Over the Course of 8 Days of Repeated Exercise Bouts

This project seeks to evaluate an external workload, as measured through total work, relative to internal workloads, as measured through. Recently, the ratio between internal and external workloads has been used to identify an athlete's risk for injury, however, many other relationships influence an athlete's performance and risk of injury, most notably, the high acute to chronic workload ratios. The acute to chronic workload ratio is a correlation between how much of a specific workload has been done in the last 7 days compared to the average workload done weekly over the last 28 days. Our investigational methods aim to examine how different measures of internal workload relate to the external workload over the course of 8 days of repeated exercise bouts. To examine this question we will monitor and assess the maximal volume of oxygen consumption at least 48 hours prior to the study. Then, participants will return to the lab and lay in a supine resting state to record their heart rate, before consuming a small snack. Next, participants will cycle for 90 minutes at a 60% workload while heart rate, VO₂, and RPE are assessed. These values will be used to predict the total work the participants complete during the 90 minutes of exercise.

Sophie Konstantacos, Sophomore, Nursing

Mentor: Lisa Mittas, MSN, RN

Role of Nurse in Client Mobility and Recovery

This research describes the importance of client mobility and passage to recovery guided by the responsibility of the nurse. This will include a general overview of identifying complications, and their NANDA approved nursing diagnoses associated with immobilization/bed rest in the hospital setting. After discussing the adverse effects imposed on each body system from immobility, the preventative measures researched will be introduced. The inclusion of client mobility and the nurse role will expand on appropriate client positioning, and assistive devices that may be used to prevent complications. After covering possible interventions for immobile clients, the interventions for promoting mobility in clients capable of a degree of ambulation. Thus, the interpersonal relationship and care provided by the nurse to overall improve client health, wellness, and function.

“Scientific research is one of the most exciting and rewarding of occupations.”
~ Frederick Sanger

Wayne Nieh, Senior, Nursing

Mentor: Amy Petrinec, Ph.D., &
Cindy Wilk

*Recruitment of Family Members
of ICU Patients: The Role of
Therapeutic Communication*

This research study aims to describe the recruitment process of family members of critically ill and mechanically ventilated patients to a study testing a new instrument entitled the Family Willingness for Caregiving Scale (FWCS). The purpose of FWCS is to measure the willingness of family members to provide bedside care to patients in an adult intensive care unit (ICU). However, involving family members in research aimed at alleviating these symptoms and advancing the body of nursing science is challenging due to the intensive nature of patient hospitalization and the uncertainty of the illness trajectory. This presentation describes the best practices and challenges to recruiting family members whose loved one is critically ill and intubated in the ICU while obtaining data to test the FCWS.

Ashley Simmons, Junior,
Exercise Science

Emily Erb, Doctoral Candidate,
Exercise Science

Mentor: J. Derek Kingsley, Ph.D.

*Resistance Exercise Alone or with
Caffeine on Measures of Arterial
Stiffness*

PURPOSE: Resistance exercise (RE) increases blood pressure (BP) and arterial stiffness; however, the impact of RE with the addition of caffeine is unknown. This study examined differences in BP and arterial stiffness in resistance-trained women responding to RE with or without caffeine. **METHODS:** Eleven participants consumed 4mg/kg of caffeine or placebo. Arterial stiffness was assessed via carotid-femoral pulse wave velocity (cf-PWV). The RE consisted of two sets of 10 repetitions at 75%1RM and one set until failure at 70%1RM for squat and bench press, with two minutes of rest between sets. **RESULTS:** There were no significant increases in BP or cf-PWV with or without caffeine. **CONCLUSIONS:** Caffeine with RE does not appear to alter BP or arterial stiffness in resistance-trained women.

Professional Practice/Outreach/ Engagement

Mackenzie Blake, Senior,
Public Health

Mentor: Cindy Widuck

*Addressing Childhood Obesity in
Portage County Ohio*

With childhood obesity on the rise in Northeast Ohio, researchers have investigated possible solutions, including increasing access to fruits and vegetables. Portage county faces a barrier to fruit and vegetable access due to food scarcity and lack of access to programs like WIC and SNAP. The Let's Grow Together Coalition combines research, best practices, and community organization to provide access to recent and accurate health information, connections to local produce and produce growers, and school activities that leave an impact beyond the classroom. Through farmer's markets, gardening and nutrition activities, children will feel empowered to make healthy choices, share their choices with friends and families, and connect with both the environment and the community.

Daylon Brown, Freshman,
Digital Media Production
Maggie Ritter, Freshman,
Nursing
Julia Grzley, Freshman, Zoology
Ryan Aquilani, Freshman,
Entrepreneurship
Ben Welch, Freshman,
Performing Arts
Emma Vanwinkle, Freshman,
Psychology
Hannah Landrum, Freshman,
Zoology
Allison Remick, Freshman,
Zoology

Mentor: Emma Sandy

Kent Campus Cars (KCC)

Kent Campus Cars, or KCC, is an on campus car rental service available to all students who are in need of vehicles. Many on- and off-campus students face this challenge whether it be financial issues or other personal reasons. Our goal is to provide a car service through Kent State that is designed to help out students who don't have cars get from place to place. We will be conducting interviews with Kent State staff and car dealerships on the logistics, as well as posting surveys for on- and off-campus students to answer. The goal of these interviews and surveys is to see if others think Kent Campus Cars is right for Kent State.

Rachel Clifford, Freshman, Art
Education
Regan Simpson, Freshman,
Fashion Merchandising
Sam Stenroos, Freshman,
Computer Science
Vincent DiLoretto, Freshman,
Digital Media Production
Aniya Stevens, Freshman,
Biology
Nathaniel Hudnell, Freshman,
Construction Management
Elijan Chaffin, Freshman,
Integrated Language Arts
Eva Bellissimo, Freshman,
Exploratory
Candace Drew, Freshman,
Fashion Design and Merchandising

Mentor: Gillian Canacci

Kent State Spring Kickoff

A Spring-off will introduce involvement in the spring semester as students return from winter break. There will be fun activities to incite energy for the upcoming semester. Students will discover and learn about clubs, organizations, and opportunities on campus. The project was introduced to campus by surveying students' with varying questions about their campus involvement going into the spring semester. Interviews were conducted with faculty to understand the approach to take. The results of the survey as of now showed that 90.7% of 107 students felt disconnected coming into the spring semester. The interviews were successful in planning. The significance of spring Spring-off is to reconnect students. The Spring-off allows clubs and organizations to share information and connect with students.

Lizzie Cooper, Freshman,
Nursing

Lindsey Bennett, Freshman,
Exploratory

Alissa Popa, Freshman, Biology

Sidney Reed, Freshman,
Construction Management

Ben Carlson, Freshman,
Nursing

Mentor: Caitlyn Mularchik

One Stop's Next Stop: Flash-Bot

One Stop's Next Stop: Flash Bot. Our project is aimed at fixing Kent State's 'One Stop for Student Services'. We would like to rework the website so it's more visually appealing and easier to use. Our goal is to improve the user interface. Access to a twenty-four hour help station can be the difference between a future flash, or a college drop-out. The research results led us to realize the campus wide issues of One-Stop and the addition of the FlashBot will help aid the students needing support. Based on all the research we have done towards our topic we have realized fixing the website is something that's needed for both students and staff. It will help students get the answers that they need.

Anthony Frasure, Freshman,
Architecture

Seaton Stumphauzer,
Freshman, Aeronautics

Cameron Schwarzenberg,
Junior, Air Traffic Control

Taylor Von Sydow, Freshman,
Nursing

Eryn Gadson, Freshman,
Fashion Design

Kiersten Sweet, Freshman,
Accounting

Harrison Miller, Sophomore,
Architecture

Ryan Greenwald, Freshman,
Psychology

Mentor: Meredith Blair

Flash Fridges

As students, we noticed a lack of accessible food options, the further students were from Eastway, Tri-towers, and the Centennial Courts. We decided it would be wise to tackle this issue by implementing "Flash Fridges" which would dispense meals to students. By using either Meal Exchanges, Flash Cash, Declining Balance, or Debit/Credit Cards, students will get fresh, affordable meals that are restocked and managed by Kent State Culinary staff. By implementing Flash Fridges in areas with minimal food options, we will minimize downtime getting to dining halls/food courts, and maximize student productivity. Flash Fridges will also serve students if it's exceptionally dark or if the weather is dangerous or unfavorable. Flash Fridges will become a necessary service to students starting in the Fall 2023 semester.

"Dive headfirst into it. Do not be afraid and do not be reserved. If you are taking a class and the teacher says, 'can I have a volunteer?' Just put your hand up every single time. Just do everything unafraid, and if you are afraid, just do it afraid." ~ Marceline Myers

Elizabeth Marhefka,

Sophomore, Biology

Mentor: L. Austin Fredrickson

Assessment of Skin Cancer

Screenings as a Quality

Improvement Initiative

Skin cancer is the most common type of cancer in the United States. The USPSTF has not determined the benefits vs. harms of routine skin exams. Proponents argue screening may improve clinical outcomes with relatively low risks of complications, whereas detractors warn against overdiagnosis, cost, and patient harm. A physician alongside student researchers conducted skin surveys at SRMC's Internal Medicine Center. The Fitzpatrick Model was utilized to determine cancer risk. Visual skin screenings were used to identify suspicious lesions. Included were 304 patients. The Fitzpatrick score average was 2.6. Fourteen percent of screened patients were 'positive'. Further evaluation was recommended. A 14% incidence of patients with concerning lesions were diagnosed. Next steps include assessing the biopsy-proved diagnosis of lesions, and the financial and time constraints on implementing wide-scale skin screenings.

Psychology

Brianna Adjei, Senior, Biology

Mentor: Clarissa Thompson,
Ph.D.

*Parents' Math Anxiety and
Attitudes towards Home Math
Learning During COVID-19*

There are many factors that may lead parents to feel math anxiety, which includes symptoms of worry, unease, as well as nervousness toward the subject. In the current study, approximately 130 participants were recontacted one year later to complete a follow-up survey in early 2022. The focus on whether a parent's self-reported math anxiety rating correlated with the importance they placed on teaching their children math at home during the COVID-19 pandemic, and their perceived ability to do so. Findings may show that parents with higher levels of math anxiety may believe that math is crucial to teach at home, yet they may not believe they are capable of teaching their children about math.

Veronica Anokhina, Junior,
Psychology

Mentor: Dana Miller-Cotto, Ph.D.

*Analyzing How Approaches to
Learning Co-Develop with Math
and Reading Skills: Kindergarten
to Second Grade*

The different ways children approach learning could give insight into how their motivation relates to their reading and math skills over time. In this study, we examined how different approaches to learning co-develop with math and reading skills in children. Approaches to learning were assessed using a 6-item scale. Results indicated that the associations between approaches to learning with math and reading increase with age. Furthering the research on approaches to learning as they relate to math and reading skills can help with determining how to improve the educational curriculum.

Tiffany Byrne, Junior,
Psychology

Mentor: Patricia Tomich, Ph.D.

*Does Time Management
Mediate the Link Between Stress
and Worse Mental Health?*

Previous research has indicated that more stress due to challenging life events is related to worse quality of life. The purpose of this research was to examine whether worse time management skills explain why stress is associated with worse mental health. Participants were 420 undergraduates (mean age = 20.88) who completed online surveys. Preliminary analyses indicated that older participants reported more stress and males reported better mental health than did females. Mediation analyses, controlling for age and gender, indicated a significant indirect effect of stress on mental health via worse time management. Overall, these findings suggest that clinicians could focus on strengthening clients' time management skills to improve the mental health of those adjusting to stressful life events.

Maria Cimino, Senior,
Psychology

Mentor: Yossef Ben-Porath, Ph.D.

*Using the MMPI-3 to Examine
the Mental Health of College
Students Before and During the
COVID-19 Pandemic.*

In March 2020, the onset of the COVID-19 pandemic had lasting repercussions, including those related to mental health. The Minnesota Multiphasic Personality Inventory (MMPI-3), a True-False standardized assessment that is one of the most widely used measures of personality traits and psychopathology in adults, can be used to examine this idea further. We examined archival MMPI-3 data from a sample of Kent State students collected pre-COVID onset and a sample collected post-COVID onset. We observed statistically significant and meaningful increases between the two groups, especially in the areas of compulsivity, psychoticism, and anxiety-related experiences. These findings have implications for treating the mental health concerns resulting from the COVID-19 pandemic by highlighting the psychological domains that have been the most widely affected.

Sarah Colditz, Post-Graduate,
Psychology

Keefe Maccarone, Graduate,
Psychology

Yossef Ben-Porath, Ph.D.,
Psychology

Mentors: Keefe Maccarone, &
Yossef Ben-Porath, Ph.D.

*Income's Impact on Spinal-Cord
Surgery*

Back pain is one of the most common causes of pain-related hospitalizations and disability in the United States. During the recovery process, individuals may experience financial strain, which can lead to increased stress, worry, anxiety, and malaise. These may cause a reduction in healing processes both physically and mentally. We hypothesize that financial stress could impede recovery. The goal of this study is to determine if individuals of higher income will experience fewer issues compared to lower-income individuals. In this study, we compared participant scores on the MMPI-3 Malaise, Worry, Stress, and Anxiety Related Experiences scales, as well as back pain disability 24 months post-surgery, and compare improvement between presurgical evaluation and 24-month follow-ups across low- and high-income individuals.

Breanna Cole, Senior,
Psychology
Brittanay Quellhorst, Senior,
Psychology

Mentor: Bryan Jones, Ph.D.

*Investigating the Role of
Social Distance on Multi-Level
Marketing Purchases*

Multi-Level Marketing companies (MLM) recruit individuals to sell goods or services by emphasizing close social relationships as business opportunities. The present study measured MLM awareness, social discounting, and the behavioral economics of purchasing goods/ services from friends and family. Participants indicated whether they had previously participated in or purchased items from MLMs, and then completed measures of social discounting and a novel purchasing task. The purchasing task gave the choice of buying items from their friends and family (representing an MLM purchase) versus keeping the money for themselves. Results showed individuals were more generous with hypothetical donations than with hypothetical purchases of MLM products.

Charlie Coward, Senior,
Psychology

Mentors: Jennifer Taber, Ph.D., &
Abigail O'Brien

*Associations of Personality
Characteristics with Medical
Care Avoidance and Health
Information Avoidance*

Individuals may avoid medical care or health information for many reasons. We examined personality characteristics in a cross-sectional study and found that lower conscientiousness, lower openness, and higher neuroticism predicted avoiding medical care, whereas lower openness was the only significant predictor of avoiding information.

Brooke Dustman,
Sophomore, Psychology
Marie Kloos, Junior,
Psychology
Cody Mitchell, Sophomore,
Psychology
Samantha Wehr, Junior,
Psychology

Mentor: Rachael Blasiman, Ph.D.

*Not Getting Any Younger
Here, but Getting Creative:
An Investigation of Divergent
Creativity and Creative
Knowledge*

Understanding creativity is vital to promoting effective problem solving in a variety of careers. However, many people have misconceptions about creativity. Using an in-person survey design, we will ask participants to rate their creativity, take a short test of creative knowledge, complete a brief divergent creativity task, and report time spent on creative hobbies. We will test three hypotheses for this study. First, we hypothesize a negative correlation between age and divergent creativity. Second, we hypothesize that women will score higher than men on hours spent on creative hobbies, divergent creativity, and creativity knowledge. Third, we hypothesize that people who spend more hours per week on creative hobbies will rate themselves higher on creativity and score higher on divergent creativity. Data collection is ongoing.

Logan Ernst, Junior, Psychology
Veronica Anohkina, Junior, Psychology
Morgan Shingledecker, Alumni, Psychology
Amelia King, Junior, Psychology
Finn Mroz-Roakes, Junior, Psychology
Tierra McClary, Psychology
Naseem Mirhaidari, Senior, Psychology
Alexandra Flowers, Senior, Psychology

Mentor: Dana Miller-Cotto, Ph.D.

Option to Offload: Examining the Utility of Working Memory in Math Problem Solving

High working memory capacity has been linked with the increased ability to solve problems (Miller-Cotto & Byrnes, 2020; Peng et al., 2016). One prevailing theoretical view is that working memory allows one to offload information to long-term memory and pull information from the long-term memory at a later point (Unsworth, Spillers & Brewer, 2012). We aim to test this view: whether having an offloading option affects one's ability to solve mathematical problems, and to what extent working memory plays a role in the ability to offload successfully. Findings may offer insights on appropriate problem-solving strategies to teach students who demonstrate working memory challenges.

Faye Fahsbender, Senior, Psychology

Mentor: William Lechner, Ph.D.

The Effect of Negative Affect on Negative Consequences Experienced with Drinking Alcohol

The effects of depressed mood on problems related to drinking is an established positive relationship. Depression symptoms have been shown to predict alcohol use earlier in life and is positively associated with frequency of alcohol consumption. The aim of this study was to analyze the bidirectional relationship between negative affect and negative consequences from drinking alcohol. During a two-week observation period, 64 subjects ages 21-65 completed assessments for negative emotional affect, alcohol use, consequences from alcohol use, and negative coping with alcohol. Depression should be analyzed to better understand its effect on alcohol use. We hypothesized that there is a bidirectional relationship between negative affect and negative coping mechanisms with drinking, and a bidirectional relationship between negative coping mechanisms and negative consequences of drinking.

“Studying psychology is fun because you’re always looking for the same things I think a writer should be looking for, which is the story behind the story”

~ Chris Cleave

Alexandra Flowers, Senior,
Psychology
Erica Cox, Junior, Psychology
Clare Lavelle, Junior,
Psychology
Tierra McClary, Psychology

Mentor: Dana Miller-Cotto, Ph.D.

*The Relationship Between
Motivation and Executive
Function*

Motivation and executive function play a critical role in how students persist and how they solve problems. The overall relationship between motivation and executive function is unclear. We define motivation as the actions one needs to do in order to reach their goal. Executive functions are defined as the mental process that allows one to focus, plan, and successfully tackle multiple tasks. We conducted a search with the following terms: self-concept, self-efficacy, identity, working memory, cognitive flexibility, and inhibitory control. Through article screening and data extraction, we will present the average effect size and demonstrate what explains the variability in the effect size.

Shannon Harris, Junior,
Nursing

Mentor: Patricia Tomich, Ph.D.

*Does Mindfulness Mediate the
Relationship Between Traumatic
Experiences and PTSD?*

Research has indicated links between traumatic experiences and PTSD symptoms. The purpose of this research was to examine mindfulness (i.e., awareness of the present moment) as a potential mediator explaining relations between more trauma exposure and PTSD symptoms. Participants were 389 undergraduates (mean age = 23.66) who completed online surveys. Mediation analyses indicated partial mediation, such that a greater number of traumatic events indirectly influenced individuals' PTSD by way of less mindfulness. Taken together, these findings support the notion that having less mindfulness plays an important role in explaining why more traumatic experiences are related to more PTSD symptoms. Overall, clinicians may consider implementing strategies to strengthen individuals' mindful awareness, particularly for those adjusting to traumatic events, in an effort to decrease PTSD symptoms.

Allianna Hite, Senior,
Psychology
Jasmin Beaver, Graduate
Student, Psychology
Matthew Ford, Alumni,
Psychology
Anna Anello, Senior, Psychology
Lee Gilman, Ph.D., Psychology

Mentor: Lee Gilman, Ph.D.

*Investigating the Effects of a High
Salt Diet on Stress Responding in
Mice*

Studies have shown how salt affects physical health, but not many studies have investigated how salt affects brain health, stress, and behavior. Female and male mice on either a high salt, control, or mixed diet were used to investigate diet consumption, along with behavioral responses to a swim stress after the diet manipulation. Tissue samples were then collected and analyzed to look at microglial activation as a measure of neuroinflammation. There were no differences in response to stress across sexes and diet condition. Microglial data are still being quantified. Overall, these experiments will help inform us about how excess salt can affect our brain health and how we respond to stress.

Hannah Johnson, Senior,
Psychology

Mentors: Jennifer Taber, Ph.D., &
Jeremy Foust

*Investigating Potential Predictors
of Perceived COVID-19 Ambiguity*

Ambiguity in healthcare creates problems when managing health, and it arises when patients are uncertain about the trustworthiness of information about risk, diagnosis, and treatment of diseases. The COVID-19 pandemic made ambiguity an even larger healthcare focus, with research examining how ambiguity predicted behavioral health outcomes. However, little research has investigated perceived ambiguity as an outcome. This research aims to identify factors of COVID-19 that are associated with ambiguity. In a longitudinal study, participants (n=495) responded to items assessing health literacy, perceived COVID-19 severity, knowledge, and spontaneous self affirmation, and demographic variables of political affiliation, age, gender, and race. Results indicated that age and gender were associated with perceived ambiguity, and significant predictors of ambiguity included health literacy, severity, and spontaneous self affirmation.

Samantha Loar, Senior,
Psychology

Mentor: Mary Himmelstein,
Ph.D.

*Male Role Norms are Associated
with Sexual Aggression Through
Precarious Manhood*

Endorsement of masculine norms has been associated with sexual aggression. Precarious manhood theory (men lose social status by behaving in ways inconsistent with masculinity) may explain why. We piloted, pre-registered, and replicated a theoretical model in which masculine norms were associated with sexual aggression both directly and indirectly through precarious manhood beliefs. Across three samples, men completed questionnaires assessing endorsement of masculine norms, belief in precarious manhood, and sexual aggression (rape myth acceptance, rape proclivity). Masculine norms were directly (and indirectly via precarious manhood) associated with rape myth acceptance and rape proclivity. These findings suggest that constructions of American masculinity are associated with interpersonal violence. Work examining how masculinity can be harnessed to decrease violence rather than contribute to violence is essential.

Samantha Lovesee, Junior,
Psychology

Mentor: Patricia Tomich, Ph.D.

*Does Personal Growth Mediate
the Link Between Trauma
Exposure and Mental Health?*

Previous research has shown that people often report personal growth (e.g., appreciation of life) after exposure to traumatic events. The purpose of this research was to examine the degree to which personal growth may explain why more traumatic experiences have a negative impact on mental health. Participants were 389 undergraduates (mean age = 23.66) who completed online questionnaires. As expected, mediation analyses indicated that there was a significant indirect effect of more traumatic events on worse mental health via less personal growth. Thus, less personal growth helps to explain why more trauma exposure is related to worse mental health. Overall, these findings suggest that clinicians could focus on strengthening personal growth as individuals adjust to challenging life events.

Blaine McCurdy, Junior,
Psychology

Mentor: Rachael Blasiman, Ph.D.

*An Examination of Trends
Between Tabletop Role-Playing
and Mental Wellness*

Games like Dungeons & Dragons have always been a topic for discussion, be it whether the game is secretly evil or if it is even fun. Recently people have started talking about if the game has any benefits. Through this study I want to answer just that. By surveying volunteers who have played games like Dungeons and Dragons, I will examine how long these volunteers have played these games and compare that to how they rate their anxiety, mood, and depressive moods. I hypothesize that the longer someone plays games like Dungeons & Dragons, the less they experience these “negative” moods.

Naseem Mirhaidari, Senior,
Psychology

Mentor: Dana Miller-Cotto, Ph.D.

*Is There a Difference Between
the Relations in Working
Memory and Math Relative to
Reading?*

Working memory is correlated with numerous academic outcomes. We know that it is essential in reading and math, but it is unclear to what extent working memory plays a role in one more than the other. In this present study, we sought to explore the relationship between working memory and math compared to working memory and reading, and the role that one plays more than the other, as well as how the outcomes can be helpful for students in the school environment and in everyday life.

Alex Moir, Junior, Psychology

Mentor: Lauren Vachon, M.F.A

*Queering Study Abroad: Finding
the Intersection Between
Pedagogies*

A literature review was conducted comparing published scientific works regarding study abroad pedagogy and queer pedagogy to determine the most effective methods for teaching queer topics abroad. Multiple education-based scientific journals sourced through the Kent State University Libraries databases were searched in an attempt to find studies, articles, or data. No research exists that combines the two pedagogies, despite both queer pedagogy and the pedagogy of study abroad being widely researched areas. Due to the lack of scientific works uniting them, these pedagogical sub-sections and their respective communities have been overlooked, even though they hold much value to the quality of learning by a student. Based on the literature review, this is a research area that has much unexplored potential.

“If you think your research would be important for the environment, for the community, and there is nothing that you are researching out in the public right now, so if you can bridge that gap and if you can use what you are researching to potentially change policies within your community, within the nation, it is something I really recommend for people to be doing.” ~ Tyrese Benson

Marissa Nicodemus, Senior,
Psychology

Cameron Russell, Senior,
Neuroscience

Lauren Scrimshaw, Senior,
Psychology

Allianna Hite, Senior,
Psychology

Jasmin Beaver, Graduate
Student, Psychology

Brady Weber, Alumni, Biology

Lee Gilman, Ph.D., Psychology

Mentor: Lee Gilman, Ph.D.

*Food-Reinforced Behaviors in
Salt-Replete Mice*

While adverse cardiovascular effects of excess salt intake have been extensively studied, baseline preferences for high-salt food have not been studied in salt-replete individuals. In ongoing studies, we're looking at this by evaluating reward-seeking behavior of mice in operant conditioning. After meeting fixed-ratio schedule criteria with 0% salt reinforcers, mice advanced to a progressive-ratio schedule. Once reaching a stable breakpoint, reinforcer salt concentrations were increased to assess reward-seeking behaviors at each concentration. The schema was then repeated to assess effects of prior exposure to higher salt concentrations. We hypothesized this prior salt exposure would lead to decreased responding at lower salt concentrations. Thus far, males have shown increased operant responding compared to females. Moving forward, we plan to investigate the effects of stressor exposure.

Summer Pawlowski, Junior,
Early Childhood Education

Mentor: Patricia Tomich, Ph.D.

*Does Impulsiveness Mediate
the Link Between Stressful Life
Events and Mental Health?*

Previous research has shown that experiencing stressful life events has a negative impact on quality of life. The purpose of this research was to examine whether more impulsiveness explains why experiencing more life events that are stressful are related to worse mental health. Participants were 420 undergraduates (mean age = 20.88) who completed online surveys. Controlling for age and gender, mediation analyses revealed a significant indirect effect of stress on mental health via more impulsiveness. In sum, these findings suggest that the experience of more life events that are stressful indirectly influenced individuals' mental health by way of more impulsiveness. Overall, clinicians could consider striving to reduce impulsiveness as one way to improve quality of life for individuals adjusting to stressful life events.

"Just know that research involves a lot of trial and error. You are going to have a lot of failures, but you walk out of that lab or office with your head held high every single day, and you take that failure as a lesson learned and not as a negative aspect of your job. You hold your head high because you know you will take that knowledge and do better the next day you walk in. Even though you are likely going to fail again, it is inevitable. You are going to learn again. You accept that, and you are going to improve. Failure is a very important aspect of growth, and it is something we need to embrace in research and our lives." ~ Jonathan Evanick

Grant Ripley, Senior,
Psychology

Mentors: Douglas Delahanty,
Ph.D., & Emily Rabinowitz

*Rumination but Not Coping Self-
Efficacy Predicts PTSD Symptoms
in Individuals Undergoing
Substance Use Detoxification*

Rumination is associated with more symptoms of post-traumatic stress disorder (PTSD) following trauma, while coping self-efficacy is associated with fewer symptoms. Research has not evaluated whether rumination and coping self-efficacy similarly predict PTSD symptoms in patients with comorbid substance use disorders. Patients undergoing substance abuse detoxification completed assessments of PTSD, rumination, and coping self-efficacy. Coping self-efficacy was highly correlated with rumination ($r = -.49$, $p < .001$) and PTSD scores ($r = -.27$, $p = .001$). PTSD severity was significantly predicted by rumination ($b = .63$, $SE = .11$, $t = 5.7$, $p < .001$) but not coping self-efficacy ($b = -.002$, $SE = .03$, $t = -1.07$, $p = .94$). Rumination but not coping self-efficacy predicted PTSD symptom clusters. Interventions aimed toward reducing rumination may be more effective at treating/preventing PTSD than those attempting to increase self-efficacy in patients with comorbid PTSD and substance use disorders.

Cameron Russell, Senior,
Neuroscience

Brady Weber, Alumni, Biology
Marissa Nicodemus, Senior,
Psychology

Allianna Hite, Senior,
Psychology

Lauren Scrimshaw, Senior,
Psychology

Isabella Spalding, Senior,
Chemistry

Jasmin Beaver, Graduate
Student, Psychology

Mentor: Lee Gilman, Ph.D.

*Plasma Membrane Monoamine
Transporter (PMAT) Deficiency
Affects Fear Response in Mice*

Plasma membrane monoamine transporter (PMAT) is an integral membrane protein that mediating uptake of monoamine neurotransmitters. Because reduced PMAT function has been linked to increased anxiety-related and active coping behaviors, we hypothesized PMAT heterozygous mice would exhibit increased context and cued fear relative to PMAT wildtypes (full PMAT function). We evaluated how both genotypes across sexes influenced responses to cued or context fear conditioning. Context fear findings showed no differences across sex or genotype, but PMAT deficiency enhanced cued fear extinction in male mice. This indicates PMAT function impedes cued extinction learning in males. Because PMAT heterozygous mice likely have similarly reduced PMAT function as people with a common PMAT polymorphism, our results suggest men with this PMAT polymorphism could be less affected by pathological anxiety.

Lindsay Scott, Senior,
Psychology

Mentor: Amy Sato, Ph.D.

*Parent Perceived Stress in
Relation to Parental Maladaptive
Eating Behaviors*

This study examined the association between parent perceived stress and maladaptive eating behaviors, and potential moderators of this association (i.e., household structure [single-parent versus two-parent households] and ratio of income-to-poverty). Participants were 92 parents of adolescents 13-18 years old. Parents completed a demographics questionnaire, the Perceived Stress Scale, and the Three Factor Eating Questionnaire. Results did not show a significant correlation between parent perceived stress and parental maladaptive eating behaviors. Higher levels of income-to-poverty significantly strengthened the positive association between parent perceived stress and parental maladaptive eating behaviors. It is possible that stress is a less salient predictor of maladaptive eating among parents from lower-income households due to differences in coping abilities. Additional research is crucial to further understanding parent perceived stress and eating.

Lauren Scrimshaw, Senior,
Psychology

Brady Weber, Alumni, Biology

Marissa Nicodemus, Senior,
Psychology

Allianna Hite, Senior,
Psychology

Isabella Spalding, Senior,
Chemistry

Jasmin Beaver, Graduate
Student, Psychology

Sarah Kassis, Senior,
Psychology

Mentor: Lee Gilman, Ph.D.

*Assessing How Reduced
Function of Plasma Membrane
Monoamine Transporters (PMAT)
in Mice Affects Contextual and
Cued Fear Conditioning*

Plasma membrane monoamine transporter (PMAT) is linked to anxiety-like behaviors due to uptake of dopamine and serotonin. Around 30% of humans have a PMAT polymorphism that reduces the function of PMAT. We used PMAT-deficient mice to understand how different environmental stressors interact with reduced PMAT function. Wildtype mice have fully functional PMAT, while heterozygous mice have reduced PMAT function, resembling the polymorphism. We hypothesized heterozygous mice would exhibit increased stress-responsive behaviors relative to wildtype controls. We observed that fear responses to aversive environments were sex-specifically affected by PMAT function, and that prior swim stress exposure ablated these genotype effects. Our findings suggest PMAT function could sex-specifically influence fear responses to unpleasant environments in humans with PMAT polymorphisms.

Dakota Smith, Junior,
Psychology

Mentor: Patricia Tomich, Ph.D.

*Does Procrastination Explain the
Link between Stress and Worse
Mental Health?*

Previous research has indicated that more stress associated with experiencing challenging life events is related to worse mental health. The purpose of this research was to examine whether procrastination (i.e., inability to meet deadlines) mediates the link between more stress and worse global mental health. Participants were 332 undergraduates (mean age = 22.02) who completed online surveys. Controlling for age and gender, mediation analyses revealed that there was a significant indirect effect of more stress on worse mental health via more procrastination. Overall, this research suggests that clinicians could focus on striving to reduce tendencies to procrastinate when individuals are adjusting to stressful life events, which in turn may strengthen their global mental health.

Cameron Wittschen, Junior,
Psychology

Mentor: Christopher Was, Ph.D.

*Do Increased Attentional
Demands Interact with Mind
Wandering and Implicit
Learning?*

Throughout this research process, we plan to extend the work of Brosowsky et al (2021), who found that mind wandering is associated with impaired explicit learning but not implicit learning. We hypothesize that implicit learning will occur even during added attentional demands beyond the primary task. Such results would have implications for implicit learning. Data collection will be completed by March 2, 2023.

Madison Yerkey, Senior,
Psychology

Mentor: Joel Hughes, Ph.D.

*Caregiving Does Not Explain
Racial Disparities in Physical
Activity Among Women Aged
19-39 in the 2019 Behavioral Risk
Factor Surveillance System.*

Young black women have high rates of cardiovascular disease (CVD). Black women have lower physical activity (PA) levels than other groups and face specific barriers (e.g. family caregiving responsibilities) that may help explain racial disparities in CVD. We expect Black women aged 19-39 will report lower PA, that family caregiving will be associated with lower PA, and that caregiving will help explain racial disparities in PA. The 2019 Behavioral Risk Factor Surveillance System (BRFSS) was analyzed using SPSS (Version 28). We verified lower PA among young Black women, however, having children and reporting being a caregiver were only weakly associated with PA and did not explain racial disparities in PA. Culturally tailored interventions to promote PA in Black women are needed.

Sam Zaborowski, Senior,
Psychology

Mentor: Clarissa Thompson,
Ph.D.

*Parent and Child Interactions
While Reading a Picture Book*

Math anxiety is a condition characterized by an avoidance of math and resulting decline in math performance. One example of a type of math that can instigate math anxiety is fractions. In our particular study, we will use a fraction-based picture book to assess the effects of such an intervention on math anxiety and fraction competency. Our study will be conducted online with parent-child dyads, where each member of the dyad will answer fraction and anxiety-related questions. Dyads will be randomly assigned to one of two versions of the book: one receiving numeracy instructions and an explanation page, while the other receives literacy instructions and no changes. Data will be collected from Qualtrics panelists in the upcoming weeks.

Social Science/Education/Public Health

Christabel Akhigbe, Senior,
Economics

Mentor: Jooyoun Park, Ph.D.

*Emigration and Development:
(Impacts on the Countries of
Origin: in BRIC, MINT, and N11
Countries)*

The application of a nonlinear property to the labor market curves of demand and supply (Neugart, 2000) creates the potential for multiple instances of equilibria across the board. Using a linear model, we find indications that a higher ratio of emigrants to labor force is correlated with higher productivity per capita. GDP per capita in G7 and BRIC countries were revealed to have a negative correlation with emigration. Conversely, large positive effects were found in N11 and MINT countries. This suggests that emigration is advantageous for developing nations. Furthermore, it implies that efforts to advance development by impeding emigration are essentially counterproductive.

Mikayla Bell, Senior,
Integrated Mathematics

Mentor: Joanne Caniglia, Ph.D.

*Academic Success and Influence
of Home Life and Caregivers*

My academic success would not have been possible without my family's support. My experience left me questioning how much others attributed their academic success to their caregivers and homelife. Through surveys and interviews with other Kent State students, I learned more about other students' experiences. I utilized qualitative and descriptive research design methods to find common themes. Of the 49 people who responded to the survey question, "Do you wish your parents/caregivers were more or less involved with your education?" 55.1% of them selected the option stating they were "Okay with their level of involvement." Future research will investigate the changes that caregiver support may have over their college experience as well as when preparing for employment.

Lilly Chevalier, Senior,
Sociology

Mentor: Jessica Leveto, Ph.D.

*Appalachia and the Attainment
of Higher Education*

According to the Appalachian Regional Commission's Appalachia Envisioned strategic plan 2022-2026, the post-secondary education attainment rate within Appalachia is an acute challenge and need in the region. This challenge is met with a strategic objective: "Develop and support educational programs and institutions from early childhood through post-secondary that provide the building blocks for skills development and long-term employment success." (ARC 2021: 20). This study identifies and addresses the barriers to higher education degree attainment in Appalachian communities using a case study approach. I examine how one program located on two Kent State regional campuses in Appalachia is designed to address achievement gaps in these communities specifically. Themes emerge that contextualize barriers, access, inequities, strengths, challenges, and future opportunities to develop programs that build long-term success.

Ren Davis, Junior, Sociology

Mentor: Tiffany Taylor, Ph.D.

*LGBTQ Curricula and Discourse
Bans Across the U.S.*

With over 300 anti-LGBTQ bills, there is a large anti-LGBTQ movement affecting U.S. public schools. Research shows that LGBTQ erasure is common in public schools through: the limited discussions surrounding LGBTQ identities and issues, school administrators not addressing bullying and harassment based on sexuality or gender, and the lack of LGBTQ resources available in schools. This study will examine the question: Why is there such a large movement to ban LGBTQ curricula and discourse in U.S. public schools? By examining the reason behind this movement, it will provide some insight as to why this is happening even though LGBTQ curricula and discourse is virtually absent in public schools, and why combating this movement is important.

Kristen DiCresce, Senior,
Public Health

Mentor: Bethany Lanese, Ph.D.

*The Value and Performance of
Community Health Workers for
At-Risk Maternal and Pregnant
Populations Such as Those in the
Stark County THRIVE Program*

Community Health Workers and Care-Coordination agencies are growing to meet the severe problem of infant and maternal mortality in Ohio, but often rely on limited resources. I used a mixed-methods approach of data analysis, literature-reviews, conducting interviews with experts in the field, THRIVE evaluation and other program meetings, and the creation of infographics and maps. The results highlight the issues and resiliency clients have that could be helped by care-coordination and interdisciplinary communication. The interviews and materials reinforce what I conclude to be field recommendations for the CHW: a standardization of training, data collection, program goals and tracking measures. This can help secure necessary funding. We must value the work and lived experience of both the client and CHW.

Priscilla Dzokoto, Senior,
Biology

Mentor: Gumino Monobe, Ph.D.

*Global Engagement:
Transnational Students' Voices
and Higher Education*

Universities and colleges in the United States encourage the presence of diversity and equity among their communities to promote healthy environments and retain a diverse and talented student body. Since the year 2012, the population of International Students/Transnational students has increased from about 900,000 to about 1,095,299 in size. As the number of transnational students increases, there are concerns about institutions' preparedness to serve this population best. Few studies have focused on why transnational graduate students do not feel a sense of belonging or sufficient support to succeed during their program. This research seeks to identify issues and challenges transnational students face as well as their strengths and perceptions of the resources the university provides.

Olivia Eader, Sophomore,
Environmental Studies

Mentor: Aimee Ward, Ph.D.

*Learning and Place: Exploring the
Outdoor Classroom*

Children deserve to connect with nature, but are not always able to do so for a myriad of factors, including urban settings, guardians' busy schedules, and lack of safe and clean outdoor spaces to occupy. This research investigated how children (n=43) aged 8 to 14 years attending summer camp retained information when learning in outdoor and indoor settings, in the context of a lesson plan about Indigenous Peoples. A crossover study design was used, allowing each participant to serve as their own control. Findings show that subjects had, on average, better quiz scores from their outdoor lesson. Our results suggest that non-traditional learning environments thrive in a camp educational setting, and that children enjoyed it more.

Jonathan Evanick,
Sophomore, Public Health

Mentor: Aimee Ward, Ph.D.

*College Student Homelessness in
Ohio*

College student homelessness in the United States has been a growing concern and is an important issue to consider when determining the situation for future generations. Higher Education opportunities for our youth are one route toward upward mobility for those wanting to break the poverty cycle. For our exploratory study, we used a mixed methods approach to examine the situations of college student homelessness within Ohio.

"I have this extraordinary curiosity about all subjects
of the natural and human world and the in-teraction
between the physical sciences and the social
sciences." ~ Ian Hacking

Kyle Goertler, Freshman,
Molecular/Cellular Biology
Kay Methe, Freshman, Criminal
Justice
Michael Bilzco, Freshman,
Mechatronic Engineering
Technology
Pennigan Ott, Freshman,
Exercise Science
Anna Grossman, Freshman,
Fashion Merchandising
Sophia Swengel, Freshman,
Emerging Media and Technology
Rylie Hutsenpiller, Freshman,
Early Childhood Education

Mentor: Lauren Korpics

*Improving On-campus Housing
Emergencies for Students with
Disabilities*

Students at Kent State with mobility disabilities have expressed challenges with navigating residence hall living, recognizing issues regarding on-campus engagement, efficiency, and belonging. We conducted research to analyze related policy oversights with the aim of increasing the quality of life for disabled students facing these problems, prioritizing the experiences of students, connection with administrative services, and successful programs at other schools. In result, we call upon the implementation of prioritized first floor housing for students with mobility issues within Kent State University's residence halls, starting with the Tri-Towers and Centennial Court halls. Such accommodations would increase the ease of student life on campus and create a greater environment of belonging at Kent State.

EmilyJo Jaeger, Freshman,
Journalism
Roni El Jaouhari, Freshman,
Psychology
Demarie Fairbanks, Freshman,
Integrated Language Arts
Charlotte Crowe, Freshman,
International Relations
Lucas Schuchovski Augusto,
Freshman, Exploratory
Andon Gaydos, Freshman,
Exploratory

Mentor: Nick Ditz

Wellness Gains

Wellness Gains will extend the hours of the recreational center for better student accessibility. The main goal of our research is to understand the demographics of people who use the recreational facilities at Kent State University and identify any issues that may be affecting the current recreational center environment. These extended hours would benefit the mental health and general well-being of students and staff members at Kent State University. Our research shows that Kent's facilities are widely used, but could be better utilized if student schedules were taken into account when determining hours of operation. Our end goal is to make the gym more accessible to everyone in the Kent State community by expanding hours of operation.

Shiah Kleinman, Senior,
Sociology

Mentor: Tiffany Taylor, Ph.D.

*Rejecting the 'Official Narrative'
and Seeking Acceptance: Identity
Work on Reddit's "r/conspiracy"*

The recent explosion of misinformation and conspiracy beliefs has led some to assert that we now live in an era of "post-truth" where facts and science are insufficient evidence for many people. Through a qualitative analysis of a popular Reddit conspiracy forum, "r/conspiracy," this study seeks to understand the interactional processes underlying the maintenance of the identity of "conspiracy theorist." Findings demonstrate four argumentative "attacks" utilized by posters to maintain their identities as conspiracy theorists: sources, knowledge, credibility, and petty insults. Finally, I argue that the nature of debate in "r/conspiracy" reproduces a post-truth-like status quo where users can maintain a positive view of their identity while never having to concede that another user is right.

Jessie Mellon, Junior,
Sociology

Mentor: Richard Adams, Ph.D.

*Neglect, Art, and Investment:
The Path to Revitalization in Two
Pittsburgh Neighborhoods*

After the decline of the steel industry, urban neighborhoods in Pittsburgh, PA declined into disrepair due to the effects of deindustrialization, depopulation, and suburbanization. More recently, some Pittsburgh neighborhoods have experienced gentrification, while others have not. One Pittsburgh neighborhood, Lawrenceville, gentrified quickly in the 1990s, with local artists and community development organizations transformed the area from downtrodden to upscale. Homewood is just beginning its development with homegrown movements that encourage investment and a sense of neighborhood pride that dissipated with a history of disinvestment, poverty and neglect. In conclusion, both neighborhoods must strike a balance between promoting business and residential growth, maintaining authenticity, and ensuring their residents can stay despite rising costs of living.

Jade Northover, Senior,
Biology

Mentor: Kelly Cichy, Ph.D.

*Black Maternal Health
Disparities*

The crisis of disparities in maternal health, or lack of resources, has harmful effects on Black women. From 2018-2020, the maternal death rate of Black women has increased from 37.3 to 55.3 per 100,000 live births, 2.9 times higher than that of White women. Many people are unaware of the disproportionate number of Black women who die due to negligence and lack of care. In this study, we are doing a thorough review of previous literature to explore research on Black women's interactions with healthcare professionals when seeking maternal care in order to bring awareness to the issue and learn more about programs and interventions in healthcare to reduce systemic racism and improve the care this demographic receives.

Samantha Remer, Freshman,
Hospitality and Event
Management

Robert Schembri, Freshman,
Criminology

Mihailo Novakovic,
Freshman, Criminology

Candy Autrey, Freshman,
Studio Art

Dylan Cahill, Sophomore,
Hospitality and Event
Management

Killian Heifner, Freshman,
Interior Design

Michelle Jalpa-Romero,
Freshman, Philosophy

Nick Lourie, Freshman,
Architecture

Nica Delgado, Freshman,
Anthropology

Mentor: Lilah Benjamin

The Interpretation Initiative

The Interpretation Initiative aims to support and provide accessibility for members of the deaf communities at Kent State University. This initiative would function as a program under Student Accessibility Services (SAS). By combining the slogan “Flashes take care of Flashes” and a “buddy system”, we aim to create a more diverse and inclusive community for both deaf and hearing-abled students. This can help connect students and develop language skills. Through a collection of surveys and interviews ranging from American Sign Language (ASL) professors, ASL Club members and deaf students themselves, we asked for proposals that could improve campus life for deaf students and troubles they faced from our current system. We also asked for suggestions and tips on how viable the Interpretation Initiative could be.

Kyotē Youst, Senior,
Environmental Studies

Mentor: David Kaplan, Ph.D.

*Growing Community in Kent,
Ohio*

Community gardening offers opportunities to foster local food security and community cohesion. This research aims to understand how and why citizens of Kent, Ohio participate in local community gardening initiatives. Numerous shared growing spaces exist throughout Kent, each one unique in organization, operation, and success. These differences were examined via direct observation and semi-structured interviews with garden organizers and participants. Our findings suggest that citizens participate in Kent’s community gardens due to a variety of perceived benefits at both the individual and community levels. Despite their many potential benefits, community gardens face challenges regarding organization and consistent engagement. Identifying key garden differences as they relate to differing levels of garden success highlights important considerations for both current and future growing initiatives.