UNDERGRADUATE SYMPOSIUM ON RESEARCH, SCHOLARSHIP, AND CREATIVE ENDEAVORS

APRIL 20, 2022

KENT STUDENT CENTER
BALLROOM
KENT CAMPUS, 1-5 P.M.

KENT STATE UNIVERSITY

Welcome from the Interim Vice President for Research and Sponsored Programs

I warmly welcome all the undergraduates and faculty mentors involved in the ninth 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 endeavors 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 studies or launching your career. By undertaking a research, scholarship, or creative endeavor experience while here at Kent State University, you are joining a 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.

Interim Vice President for Research and Sponsored Programs

Special Thank You

Sheila Pratt, who helped organize the 2021 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 with the Office of Student Research.

Ella Wold, who collected student submissions, edited abstracts, and designed the interior of the program for the 2021 Undergraduate Research Symposium.

Ella is studying Spanish Translation. They have been a writing intern at Kent State University's Office of Student Research during the spring 2022 semester.

Abdelraham Emam, who created the design for this year's brochure cover for the Undergraduate Research Symposium brochure and edited it.

Abdelraham is studying Business. He has been working as a Marketing and Communications Assistant with Kent State University's Office of Student Research since August 2021.

Undergraduate Contributors

Categories

Architecture

Posters

Maryam Alshirawi, Senior, Interior Design
Sombre Carleton, Senior, Interior Design
Mentor: Tina Patel, M.A., M.F.A., B. Arch.

Pliable Interiors to Meet Sensory Needs of Children with Autism Spectrum Disorder

This design prototype intends to provide a pliable space for students with autism, adapting to their sensory needs. Pliability allows for flexibility to varying conditions. The design achieves this through manipulation of form, movable surfaces, and spaces within spaces. The spatial proximities and transition points are deliberately situated to make navigation easier for them. This is intended to be an environment that caters to the student's needs rather than forcing them to respond to the design of the building. The students will have agency in deciding how much stimuli they will be interacting with. This design aims to have the students as the central focus, encouraging them to thrive here.

Katherine Armstrong, Sophomore, Architecture
Mentor: Brett Tipey, Ph.D.

History and Architecture: How Political Trends Fueled the Fall and Resurgence of Archigram

The surge of counterculture movements within the 1960s saw similar trends within architecture with the rise of Archigram, a British quasi-socialist architectural collective. Archigram became known both locally and internationally, with Archigram's impact earning them a Royal Gold Medal for architecture. Yet, throughout the ensuing decades, the grand historical narratives written pay Archigram varying levels of attention; accounts written towards the end of the 20th century almost entirely ignore their work, while accounts written from the early 21st century onwards treat it as a defining movement in 20th-century architecture. The disappearance of Archigram within historiographical accounts during the end of the 20th century can be related to the rise of the conservative movement during the same time, with the resurgence of Archigram being concurrent with the trend towards liberalism starting in the early 21st century.

Mario Coachman, Junior, Architecture

Multifamily Housing: Proposing Solutions to the Lack of Affordable Housing

Without a doubt, there is a need for more affordable housing in Cleveland. But, how exactly can you create more affordable homes without also creating to market rate housing to incentivize investors? My goal is to explore the concept of promoting the investment in more affordable housing. This would consist of figuring out a design approach to mixing affordable housing with regular market price housing. As well as, researching its effectiveness in combating gentrification and reducing displacement of former residents of a certain site. Through analyzation of other multifamily and mass affordable housing case studies I will evaluate how these homes create typologies to support this mix. Also, the site will be analyzed to ensure that both the projected design will be effective and meaningful on the site. I hope to create an example and proposal of how to create multifamily affordable housing that would help with the housing crisis and reduce displacement in the surrounding area.

Ronn Holmes, Senior, Architecture
Mentor: Rui Liu, Ph.D.

Exploring Tensile Structures

The utilization of tension or suspension cabling is normally associated with bridge or canopy structures, but the general principle can be applied to a variety of building forms. This research endeavor will seek to analyze how tensile force can be used to create efficient and extraordinary structures. Through examining case studies to showcase the potential of cable structure, the project will highlight the various advantages compared to conventional support methods. These advantages can be summarized in both the expression and the economy of the final design, as cable systems eliminate the need for excessive amounts of support material such as concrete or conventional steel columns.

Gianna Ignazio, Senior, Interior Design
Zachmann Skala, Senior, Interior Design
Mentor: Tina Patel, M.A., M.F.A, B.Arch.

Playing with Gradient of Interactions to Foster Learning in Children with Autism Spectrum Disorder (Design of a Prototype)

Autism Spectrum Disorder (ASD) is a developmental disability caused by differences in the brain and is categorized by persistent deficits in social communication and interaction skills across multiple contexts. Applied Behavior Analysis (ABA) in Northeast Ohio is planning to open a center to provide services for students with ASD, ages 2-21. After research, the intent of the prototype for this facility is to provide an environment that allows children with different sensory needs to learn and interact with others seamlessly. Through manipulation of surfaces, moments of interaction and isolation were created to meet the diverse sensory needs of children with ASD. Additionally transitional spaces, clear way-finding, and spatial sequencing lead to a welcoming and inclusive environment for children with ASD to learn, collaborate, and interact.

Oluwatobi Karim, Senior, Architecture
Mentor: Rui Liu, Ph.D.

Robotic Construction for Masonry Structures

Construction is a dangerous and labor-intensive process with fatalities annually. This research focuses on how to reduce this construction pitfall and make it more efficient with automation tools like the robot arm. A robot arm with six degrees of freedom is being used to build expressive architectural structures like arches and vaults. Extensive literature reviews and precedents show endless possibilities with reduced costs and consumption of raw materials associated with climate change (indirectly mitigating it). This research applies Rhino/Grasshopper visual scripting to engage an industrial robot arm to build these expressive forms. As a result, the need for intelligent (smart) construction from automation tools becomes apparent with them making the laborious traditional processes safer and efficient.

Art

Oral Presentations

Mayhugh Cebula Fox, Junior, Dance
Mentor: Jeffrey Rockland, M.A., M.F.A

Bringing Israeli Dance to Kent State

East Meets West is a student organization that creates opportunities for artistic collaboration, engages diverse educational experiences, and builds global citizens for the 21st century. In September 2021, the organization had the opportunity to collaborate with a well-respected Israeli choreographer, Dr. Rina Badash. Israel is a leader in cutting-edge, current, and innovative contemporary choreography. Once arriving in Kent, Dr. Badash auditioned and casted five students in her dance Black Curtain. In addition to creating a piece, she taught Israeli contemporary dance to dance students and a lecture on the country of Israel. My presentation illustrates how the residency of Dr. Rina Badash impacted student understanding of the multiple functions of dance within Israeli society and made KSU students aware of the career opportunities this country offers.

Art

Posters

Kyle Czatt, Senior, Visual Communication Design
Mentor: Jillian Coorey, M.F.A.

Home

Home is a place where you feel most comfortable, most like yourself. Behind closed doors we are at our peak, but what if you could bring that feeling wherever you are? One simple question can change a person's perspective on where they are; and it starts with engagement. Through this project, the different perspectives and ideas that individuals have on the idea of "home" have been carefully illustrated. Through survey data, articles, and interviews; a poster series and booklet are displayed, sharing three main ideas on what "home" is.

"Art is research into the unknown, adding a little to the fund built up by earlier generations. This is the task of the artist"
– Olle Baertling

Jessica Miller, Senior, Visual Communication Design
Clara Britton, Senior, Chemistry
Bella Kaufman, Junior, Early Childhood Education
Mentor: Charlie Malone, M.F.A

Brainchild

Brainchild is the award-winning literary and arts magazine based at the Kent State University Honors College. Brainchild strives to capture the creative essences of students throughout the Mid-East Honors Association region. Our team accomplishes this goal by curating meaningful student literature and art into the annual issue of our magazine. During the fall semester of each year, we focus on one crucial question: What does it mean to publish art and literature? We also experiment with various marketing strategies to elicit submissions. During the spring semester, we select and polish the most eye-catching and unique pieces into a cohesive collection. This year's primary goals are to increase the number of submissions we receive, despite the pandemic's effect on in-person learning, and to prioritize accessibility and diversity.

Alena Miskinis, Senior, Music (Piano Performance)
Mentor: Joshua Albrecht, Ph.D.

Translating Words into Music: Musical Expression of Figurative Language

Although musicians and nonmusicians alike use figurative language to describe music, the relationship between the descriptor and musical expression is still unclear. This study explored how instrumental music majors musically express given descriptors. Participants were audio and video recorded as they performed five given excerpts with five given metaphors in mind: lively, dark, cold, mournful, and tender. Preliminary results from seventeen participants suggest that tempo, articulation, and dynamics are the most commonly altered musical characteristics between the different descriptors. For example, mournful has been unanimously performed with the slowest tempo, while lively with the fastest tempo and shortest articulation. Dark and cold, identified by participants as the most ambiguous to express, have been interpreted as a color, temperature, and/or emotion.

Anna Somerville, Senior, Music Education (Instrumental)
Mentor: Jennifer Johnstone, Ph.D.

The Death of the Vielle and the Rise of the Violin

The vielle was one of the most prominent instruments in medieval music; however, its popularity suddenly and drastically decreased at the end of the fifteenth century. Notably, the invention of the violin seems to mark the end of the vielle's acclaim. Many factors contributed to this transition, including adaptations to new musical styles and sociopolitical conditions. The vielle, used primarily for accompaniment, became associated with the troubadours and trouvères of medieval France. The reduced notoriety of these musicians at the end of the medieval period may have caused the vielle to fade out with them. This paper explores the musical and extramusical factors that contributed to the decline of the vielle in medieval secular music and how this contributed to the creation of the violin.

Biology/Ecology

Posters

Ashley Fink, Senior, Environmental and Conservation Biology (Environmental Policy and Management)

Jacob Arnold, PHD Candidae at Clemson
Mentor: Mik Dale & Jacob Arnold, Ph.D. Canditate

Critically Connected Communities

This study focuses on the vulnerability of electricity transmission infrastructure and how it influences community resilience in North and South Carolina. Using ArcGIS Pro, data from the National Risk Index (NRI) and Homeland Infrastructure Foundation Level Database was analyzed. North Carolina exhibited lower total resilience compared to South Carolina and higher vulnerability to natural hazards. High vulnerability is an internal problem for communities; whereas high external connectivity is an external problem, especially in very vulnerable areas. Tracts that have a high vulnerability score need fortification, especially the tracts that also have low resilience. Focusing on electricity infrastructure and its influence on community resilience provides a framework for policy suggestions and the methodology established in this study can be extended to other community connectivity infrastructure.

Morgan Hughes, Senior, Zoology
Mentor: Lauren Kinsman-Costello, Ph.D. & David Costello, Ph.D.

Effects of Simulated Resuspension Events on Phosphorous Concentrations in Sandusky Bay, Lake Erie

Sandusky Bay (SB) is a Lake Erie bay fed by runoff from agricultural land. This contains phosphorus (P), which can lead to an overgrowth of algae. Sandusky Bay typically experiences a harmful algal bloom (HAB) every year. SB is turbid due to wind resuspending the sediment beneath the shallow water. This may affect P concentrations in the water column, influencing HAB formation. Our goal was to examine the influences of turbidity on P concentrations during simulated resuspension events. We collected intact cores from Sandusky Bay during the summer of 2021 and used a custom resuspension apparatus to simulate resuspension events. We measured turbidity and P concentrations over four hours. P fluctuated throughout resuspension events, indicating that turbidity influences P concentrations in the water column.

"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

Rachel Lasso, Senior, Environmental and Conservation Biology (Environmental Policy and Management)
Mentor: David Ward, Ph.D. & Leland Bennion, Ph.D. Candidate

Eastern Red Cedars Shape Stand Structure of Oak Woodlands

Juniperus virginiana, commonly known as eastern red-cedars, is a species of juniper tree native to North America, but is becoming a threat as they encroach past their historical range. This is increasingly becoming a problem in states like Oklahoma, where eastern red-cedars are encroaching in remnant patches of prairies in the Great Plains, one of the most endangered ecosystems in North America. Using aerial photography, we identified cedar stands in Stillwater, Oklahoma and set up plots in the stands. We recorded the coordinates, diameter, and height of the trees in each plot. Data collected helps us better understand the mechanisms red-cedars use to dominate landscapes and their encroachment patterns.

Tabitha Ludwiczak, Senior, Zoology
Mentor: David Costello, Ph.D.

Flux and Accumulation of Tire Road Wear Particles in the Campus Center Water Quality Basin

The Campus Center Water Quality Basin (CCWQB), located on Summit Street, receives runoff from main roads and parking lots on Kent State's main campus. Tire and road wear particles (TRWP) are a pollutant from vehicle emissions that may impair aquatic ecosystems; and we hypothesized that TRWP may be accumulating in CCWQB. For this research, we sampled particles in runoff after precipitation events from spring until late fall 2021 and collected soil from six areas in the CCWQB away from the stormwater inflow. For this study, we used a particle floating procedure; digested soil samples; and measured zinc concentrations, indicators of TRWP, using ICP-OES. This information will help understand TRWP that could pollute waterways surrounding roads and parking lots and its effects on aquatic organisms.

Maya Niesz Kutsch, Junior, Botany
Mentor: Christopher Blackwood, Ph.D.

Evaluating the Effect of Tree Species on Soil Fungal Saprotroph Traits and Decomposition Rates

Tree roots engage in a symbiotic relationship with specific soil fungi, known as a mycorrhizal relationship. Most tree species are obligate to either arbuscular mycorrhizal fungi or ectomycorrhizal fungi. The species of trees in an area will affect the fungal composition of the soil. We sampled leaf litter from plots in Jennings Woods in Ravenna, OH that are dominated by either arbuscular or ectomycorrhizal trees. From the "source" leaf litter we cultured saprotrophic fungi and put these isolates in microcosms with sterilized "test" leaf litter. The test leaf litter species are Cornus sp. and Quercus alba. Each microcosm has one species of test leaf litter and one isolate. We are investigating how the decomposition rates of the test leaf litter are affected by plot type.

Lauren Tarver, Junior, Zoology
Mentor: Matthew Lehnert, Ph.D. & Jiansheng Feng, Ph.D.

Material Properties and Morphology of Prestomal Teeth in Relation to the Feeding Habits of Diptera (Brachycera)

Prestomal teeth are cuticular projections on the mouthparts of some fly species that rasp surfaces when feeding. The material properties of prestomal teeth are correlated with feeding habits in this study. Scanning electron microscopy revealed a variation in the labellum size, number of pseudotracheae, and number of prestomal teeth of flies with different feeding habits. Confocal microscopy and energy dispersive x-ray spectroscopy revealed that prestomal teeth are heavily sclerotized and contain low concentrations of inorganic elements and the labellum contains resilin. Nanoindentation showed that the insectivorous *Scathophaga stercoraria* had the hardest prestomal teeth and the highest elastic modulus. Our findings indicate that material properties relate to feeding habits.

Biology

Posters

Olesia Benedict, Senior, Neuroscience
Mentor: Robert Clements, Ph.D. & Elda Hegmann, Ph.D.

Using High-Resolution Confocal Microscopy to Create 3D Organs and Vessels for Liquid Crystal Elastomers

The purpose of this study is to design and print three-dimensional models to grow cells in arrangements similar to that in vivo for lab study and bio implantation. The aim is to print digital models of vascular networks generated from microscope images of tissue to provide a scaffold to grow cells for a study. To accomplish these aims mice were injected with Evans blue, a dye to stain the microvasculature and cause the organs to fluoresce underneath the microscope subsequently, the organs were cleared with different percentages of methanol and Benzyl Alcohol/Benzyl Benzoate (babb). The organs were then imaged using high-resolution confocal microscopy. Using the images obtained from the microscope three programs were used to generate the 3D model for printing. Models were printed using a DLP 3D printer. Future steps are using liquid crystal elastomers to print the generated models, grow cells within, and analyze cell proliferation and alignment.

"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

Hunter Frey-Burkart, Junior, Neuroscience
Maddison Trissel, Senior, Nueroscience
Mentor: Eric Mintz, Ph.D.

Effects of Globally Antagonizing CB1 Receptor on Circadian Free Running Period in Mice

The suprachiasmatic (SCN) nucleus is a thalamic nucleus that regulates many daily rhythms and physiological functions in mammals. The SCN takes external ques, primarily light, to synchronize biological rhythms. One system that is known to interact with the suprachiasmatic nucleus is the endocannabinoid system (ECS). There is evidence showing that the endocannabinoid molecules 2-arachadinylglycerol (2-AG) and anandamide (AEA) have a role in the synchronization of the circadian clock with light. To further elucidate the role of the ECS in the SCN, mice were injected with either an antagonist to the ECS or a vehicle to mice via intraperitoneal injections. Injections were repeated daily at a consistent time. Activity was measured in the mice to see the affects of antagonization on circadian free running period.

Violet Hutchinson Goldinger, Senior, Biology (Molecular and Cellular Biology)
Mentor: Helen Piontkivska, Ph.D.

Deciphering Changes in ADAR Editing Landscapes in Viral Infection

The extent of infection-triggered changes in ADAR expression being translated into host editing changes, and whether these changes underlie disease pathogenesis and clinical symptoms, remain unclear. Here we are trying to close this gap by looking at editing patterns in norovirus (NoV) infection RNA-seq dataset. We are examining patterns of ADAR gene expression, whether different ADARs are elevated in infection and/or control, and the association with changes in editing patterns of host transcripts. We expect genes that show consistent change in editing during infection are those most likely to play a role in NoV infection, whether for viral life cycle or disease etiology.

Hannah Lee, Junior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)
Lana Frankle, Other, Neuroscience
Kole Jarzembak, Junior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)
Mentor: Robert Clements, Ph.D.

Effect of Exercise on Cuprizone Mediated Demyelination

Demyelination diseases cause damage to the central nervous system breaking down the protective myelin sheath surrounding the nerve cell. This damage can cause numerous problems within cell communication and can lead to a loss of function. The cuprizone model is a model of toxic demyelination and earlier studies have suggested that exercise provides neurological benefits. This study is designed to understand the role exercise plays during cuprizone treatment. Over 6 weeks, 8 juvenile male mice were split into running and non-running groups and were all fed cuprizone pellets. Change in weight, MRI intensities, microscopy intensity overlap, and western blots were all used to understand why and if the exercise treatment may be used for neurological benefits.

Sarah Melen, Junior, Biology (Molecular and Cellular Biology)
Caroline Nitirahardjo, Other, Biology
Mentor: Helen Piontkivska, Ph.D.

Neurological Complications in SARS-CoV-2 Infections: Insights from Variants of Concern

We review the associations described between SARS-CoV-2 variants and neurological symptoms observed in COVID-19 patients. Studies have shown that COVID-19 is linked with cytokine storms, increased inflammation, and disruptions in the action of ACE-2 receptors, among other proposed mechanisms, although the mechanistic link between SARS-CoV-2 infection and neurological outcomes remains unclear. Because RNA editing-mediated antiviral response also plays a key role in gene regulation, we explore whether any of the symptoms may be attributed to the dysregulation of the host immune response and its downstream consequences, rather than direct impact of the infection itself. Importantly, RNA editing dysregulation consequences may have long-lasting effects even after the infection is no longer detectable.

Zoha Shaikh, Sophomore, Medical Technology
Mentor: Jennifer McDonough, Ph.D.

Testing Neuroprotective Therapies in Multiple Sclerosis

Multiple sclerosis (MS) is an inflammatory neurodegenerative disease of the central nervous system. It is the major cause of neurological disability in adults aged 20-40 years old. MS can impair the motor, sensory, and cognitive processes. MS is partly an autoimmune disease and there is neurodegeneration. We have hypothesized that Betaine will increase expression of mitochondria genes and decrease pathology in axons in the mice. I tested the methyl donor betaine as a potential therapy for neurodegeneration in MS. I performed immunohistochemistry and western blotting experiments with spinal cords from EAE mice and EAE mice treated with Betaine. My data suggests that betaine will improve mitochondria and protect axons in the experimental autoimmune encephalomyelitis (EAE) mice which are a mouse model of MS.

Jordan Smith, Junior, Public Health (Pre-Medicine, Dentistry, Osteopathy)
Roman Giacomino, Sophomore, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)
Dinah Walter, Junior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)
Mentor: Colleen Novak, Ph.D. & Christina Watts, Ph.D. Candidate

Using Designer Receptor Exclusively Activated by Designer Drug (DREADD) Technology to Assess Predator Odor-Induced Skeletal Muscle Thermogenesis

Using designer receptor exclusively activated by designer drug (DREADD) technology and SF1-Cre mice, this study investigated the neuronal mechanism underlying predator odor-induced skeletal muscle thermogenesis. Mice received stereotaxic injections into their ventromedial hypothalamus containing either a control vector or an excitatory vector that allowed the expression of excitatory receptors in the steroidogenic factor-1 (SF-1) neurons. These receptors could later be selectively activated for burst firing of the SF-1 neurons using clozapine N-oxide (CNO) injections, after which mice were assessed within the first hour post-injection without contextual changes. Mice were then placed under controlled activity (treadmill walking) for 30 minutes and exposed to predator or control odor. Preliminary data support the mechanistic role of SF-1 neurons in energy expenditure within the context of skeletal muscle thermogenesis.

Madison Trissel, Senior, Neuroscience
Hunter Frey-Burkart, Junior, Neuroscience
Maryn Montgomery, Senior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)
Timothy Niepokny, Other, Biology
Emily Welch, Other, Biology
Mentor: Eric Mintz, Ph.D.

Timed Daily Restricted Feeding Surpresses the Reproductive System in Mice

The focus of this experiment is to show the impact of 4-hour daily restricted feeding cycles on the reproductive system in female and male mice. Half of the mice were subjected to restricted feeding cycles during the late afternoon, while the other half had food ad libitum (AL). Vaginal cytology was used to track the estrous cycle in the female mice. After 4 weeks blood plasma was collected and assayed for estradiol and testosterone concentrations. Our results from the estrus tracking showed the RF females cycled irregularly or entered amenorrhea while the AL females cycled normally. We hypothesize that the RF females will have low estradiol levels, while the males will have no significant difference in testosterone levels.

Biomedical Sciences

Posters

Anna Anello, Senior, Nueroscience
Mentor: Richard Piet, Ph.D.

The Effects of Serotonin on Kisspeptin Neurons

In females, ovulation is triggered by the massive release of gonadotropin hormones. This is driven by neurons in the hypothalamus, including neurons that produce the neuropeptide kisspeptin. Evidence in rodents indicates that the neuromodulator serotonin (5-HT), acting at 5-HT2 receptors, regulates this process. How this is achieved, however, is unknown. We hypothesized that 5-HT stimulates kisspeptin neurons via activation of 5-HT2 receptors. Using calcium imaging in brain slices, we provide evidence that 5-HT increases kisspeptin neuron activity. This effect was substantially reduced in the presence of a 5-HT2 receptor antagonist, ritanserin. We conclude that 5-HT stimulates kisspeptin neurons, at least partially, via the activation of the 5-HT2 receptor. Excitation of kisspeptin neurons might contribute to the effects of 5-HT on the LH surge.

"Modern medical advances have helped millions of people live longer, healthier lives. We owe these improvements to decades of investment in medical research."
-Ike Skelton

Ryan Chema, Junior, Mechatronics Engineering
Mentor: Hossein Mirinejad, Ph.D.

Design of Closed-Loop Controller for Ventilation Systems

Underdeveloped organs make neonates regular victims of cardiac shunts leading to serious damages to their pulmonary system. The effects of cardiovascular shunts can be minimized via oxygen therapy. The goal of oxygen therapy is to administer an elevated oxygen level to maintain adequate tissue oxygenation in patients. A model of the neonatal oxygen system and basic PID control have previously been established. The current work focuses on developing an advanced control algorithm using optimal control design techniques to optimize oxygen inspiration on ventilation systems. The control goal is to keep the arterial oxygen saturation percentage close to the target value by adjusting the FiO2 level. The proposed control algorithm aims to conserve oxygen and address the inefficiency of the current state-of-the-art oxygen control algorithms.

Caden Hearn, Senior, Nueroscience
Mentor: Devin Mueller, Ph.D.; Derek Damron, Zachary Knauss

Administration of D-Cysteine Ethyl Ester During Acquisition of Conditioned Place Preference Abolishes the Expression of Fentanyl-Seeking Behavior Without Forming Maladaptive Behaviors or Loss of Analgesic Efficacy

Abuse of opioids leads to addiction and can cause opioid-induced respiratory depression. One possible way to reduce overdose deaths is to target addiction by eliminating drug seeking behaviors. The first experiment determined the most effective dose of fentanyl to model drug seeking. Long-Evans males were assigned to fentanyl dosages and resulting fentanyl-seeking behavior was measured using a conditioned place preference paradigm. 5ug/kg resulted in the highest preference for the fentanyl chamber. The second experiment tested the ability of DCYSee to disrupt the acquisition of fentanyl seeking behavior. DCYSee prevented acquisition of fentanyl-seeking at a dose of 10mg/kg. The third experiment used an open field to determine negative effects of DCYSee. Results showed no maladaptive behaviors when administered alone or in combination with fentanyl.

Peighton Neuman, Senior, Biology (Molecular and Cellular Biology)
Andrew Whitfield, Sophomore, Biology (Molecular and Cellular Biology)
Mentor: Manabu Kurokawa, Ph.D.

Generating Conditional HUWE1 Knockout Mice

Conditional knockout mice are an important research tool because you can control where and when a gene of interest is deleted. With this capability, researchers can find an in vivo function of the gene. Our lab is interested in the Huwe1 gene and its roles in development and diseases. Huwe1 encodes a ubiquitin E3 ligase, an enzyme that promotes protein degradation, and is known to regulate cell proliferation and cell death. However, its in vivo role remains unclear. Conventional Huwe1 gene knockout was already shown to be embryonically lethal. Thus, we created various conditional Huwe1 knockout mice to determine the impact of Huwe1 deletion in different tissues. Here we discuss our genotyping schemes and phenotypes of various tissue-specific Huwe1 knockout mice we created.

Wayne Nieh, BSN 2nd year, Nursing
Mentor: Daniela Popescu, Ph.D.

A Review Study of Vitamin K: The Forgotten Vitamin

Nature provides the fat-soluble vitamin K in two forms: K1 and K2. K1 can be found in green leafy vegetables and K2 can be found in various organs including the brain, pancreas, and testes. The goals of this project were to research the current literature and explore the roles of vitamin K in human health and its mechanisms of action. The Medical Subject Headings Database in PubMed and Zotero were used to search, collect, and organize the recent published peer-reviewed articles. After searching the literature, we found studies demonstrating that vitamin K may play essential roles in preventing or treating various diseases including osteoporosis, diabetes, cancer, osteoarthritis, and dementia. Some of these diseases are age-related; therefore, vitamin K could lower the costs of health care.

Alyssa Reinagle, Junior, Biotechnology
Mentor: Edgar Kooijman, Ph.D.

Liquid Droplet Binding Properties of Perilipin 3

Lipid droplets are organelles expressed in almost all cell types and are the only intracellular organelles that contain a lipid monolayer rather than a bilayer. Proteins localize and bind to this monolayer as they do to intracellular lipid bilayers. The mechanism by which cytosolic lipid droplet binding proteins recognize, and bind, to this lipid interface remains poorly understood. The mechanisms of the binding and localization of perilipin 3 will be explored using pendant drop tensiometry to measure changes in surface tension due to protein binding at varying lipid monolayer compositions as well as using fluorescence microscopy of live adipocytes with mutant α-helix bundle domains of perilipin 3 to compare differences in binding affinity.

Nathan Ritchey, Junior, Neuroscience
Thywill Etty, Other, Neuroscience
Mentor: Lique Coolen, Ph.D.

Intraspinal Injections of AMPA Antagonsit Block the Ejaculation in Male Rats

Chronic spinal cord injury results in sexual dysfunction in men and rats, including anejaculation. Ejaculation is controlled by a spinal reflex generator in the lumbosacral spinal cord. The role of AMPA receptors in these generator cells is currently unknown. Therefore, we hypothesize that AMPA receptors are necessary for sensory processing and ejaculatory reflex. Indeed, we showed that the AMPA receptor was fundamental to the ejaculatory reflex, as intraspinal injections of antagonist NBQX blocked sensory nerve stimulation of the ejaculatory reflex. The data support the hypothesis that AMPA receptors are necessary for ejaculatory reflex activation.

"Everything is theoretically impossible, until it is done."
-Robert A. Heinlein

Eric Takacs, Senior, Biology (Molecullar and Cellular Biology)
Mentor: Manabu Kurokawa, Ph.D.

The Role of the Ubiquitin E3 Ligase HUWE1 in Non-Alcoholic Fatty Liver Disease

Non-alcoholic fatty liver disease (NAFLD) encompasses a spectrum of liver disease states, all involving excessive hepatic lipid uptake (steatosis) in individuals who consume insignificant amounts of alcohol. It is estimated that 25 percent of North Americans have NAFLD in some form, making it the most common liver disease, and there is no FDA-approved therapeutic available. The Kurokawa lab previously discovered that liver-specific deletion of the Huwe1 gene, encoding an E3 ubiquitin ligase, was able to prevent mice from developing high-fat diet-induced NAFLD. The current project aims to demonstrate that aged mice that have already developed NAFLD can be rescued by inducibly knocking out the Huwe1 gene in the liver.

Benjamin Wales-McGrath, Senior, Chemistry (Biochemistry)
Mentor: Helen Piontkivska, Ph.D.

Does Dysregulation of ADAR RNA Editing Contribute to Neurodevelopmental Consequences of Congenital Infections?

ADAR RNA editing enzymes are overexpressed in response to viral infection and have been shown to play a role in antiviral immune response through viral genome editing. However, the effect of this overexpression on editing of host transcripts remains unclear. The crucial role and dynamic regulation of ADAR in brain development make this particularly important to understand in the context of congenital infections by viruses such as Zika virus (ZIKV) and cytomegalovirus (CMV), especially in the context of the neurodevelopmental symptoms frequently caused by these infections. Here, we use publicly available RNA-seq data to examine RNA editing in congenital infections of ZIKV and CMV. Our results show increased editing in infection, including in pathways relevant to brain development and immunity.

"The more important reason is that the research itself provides an important long-run perspective on the issues that we face on a day-to-day basis." -Ben Bernanke

Computer Science/Mathematics/Aeronautics/Engineering

Posters

Ethan Armstrong, Senior, Actuarial Mathematics
Mentor: Aloysius Bathi Kasturiarachi, Ph.D.

Solutions to the Huddle Equation

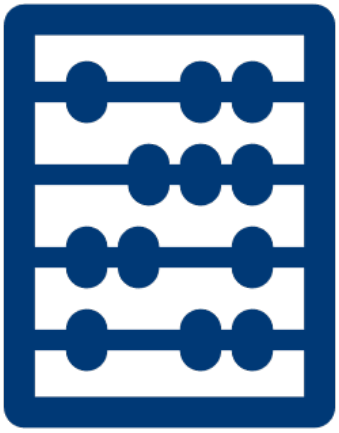
Consider a collection of positive integers such that their product equals their sum. When fixing the size of the collection, there are only a finite number of solutions. For instance, 2 + 2 = 2 x 2 is the only example for a pair of 2 positive integers. Consider what properties would change if a larger set of numbers were used, like the Gaussian or Eisenstein integers. Such numbers are extensions of the integers that live in the complex plane. As it turns out, the addition of extra units (numbers that can be multiplied to equal 1, such as by -1 or i) mean that some cases have infinitely many solutions, like n + i – i =n x (i) x (-i) for arbitrary n.

Cameron Gmitra, Junior, Actuarial Mathematics
Mentor: Aloysius Bathi Kasturiarachi, Ph.D.

Creating Geometric Portraits of Infinite Series

We have explored new ways of approaching the subject of infinite series to create a simple picture of their sums based on basic geometric techniques. Through the use of circle packing, the sum of an infinite series can be shown as circles cascade inward to infinity. Additionally, more complex convergent series can be represented through stereographic projection of points in the series onto a line or the unit circle. Though infinite series have been explored extensively through algebraic techniques, we want to create a new viewpoint on convergent series with a geometric approach. The new ways we have found to represent these series are both simple and intriguing. Several geometric portraits of infinite series will be depicted as “proof without words” visualization images.

“Without troublesome work, no one can have any concrete, full idea of what pure mathematical research is like or of the profusion of insights that can be obtained from it.”
-Edmund Husserl



Kyle Rediger, Senior, Aeronautics (Flight Technology)
Mentor: Jason Lorenzon, J.D.

Air Disasters and Engineering Faults

Air disasters have shaped the industry that millions of passengers and tons of cargo move through every day. Learning from these cataclysmic events not only saves lives, but prevents these accidents from happening again. In my research, I have examined the many flaws and failures associated with the McDonald Douglas DC10, the Concorde, and the Boeing 737 MAX 8 (800 series). In these accidents it is important to note how a design flaw that was manufactured had been passed along; and these aircrafts were pushed to market without the repercussions of their actions. Looking at these accidents from a National Transportation Safety Board Investigator In Charge (IIC) perspective, one can see how there is a rush to get the answers on why these accidents happened and give a sense of closure to the families of the deceased loved ones. They also rush to clear up any media speculation caused by their so called "Aviation Experts" as seen with the Boeing Max 8 crashes.

Godwin Shitta, Senior, Aerospace Engineering
Mentor: Ye Lu, Ph.D.

Aerodynamic Database for Blunt-body Design Hypersonic Vehicles

This research focuses on enabling rapid space mission design for planetary exploration. The objective of this research is to develop an aerodynamic database for blunt-body design hypersonic vehicles. The database will then be used for mission design and analysis using different maneuvers such as atmospheric entry, aerocapture and aerogravity-assist maneuvers. This research applies modified Newton's Fluid theory to model flow across different geometries to derive estimates of the aerodynamic coefficients for a variety of hypersonic vehicles. A panel code implemented in MATLAB was used to derive the necessary formulas. Today, new classes of hypersonic vehicles are emerging throughout the world. As a result, the need for optimizing aerodynamic performance of these vehicles becomes apparent for mission design specifically for entry and re-entry missions.

"Research is seeing what everybody else has seen and thinking what nobody else has thought."
-Albert Szent-Györgyi

Exercise Science

Poster

Yousuf Abu-Amara, Senior, Exercise Science (Pre-Physical/Occupational Theraphy/Podiatric Medicine)
Mentor: Adam Jajtner, Ph.D

Differences in Leukocyte Response Post Resistance Exercise in Trained Men and Women

PURPOSE: To compare sex differences in leukocyte responses following resistance exercise. METHODS: Participants completed squat protocol (8x10, 70%1RM). Blood samples were assessed for WBC, lymphocytes (LY), granulocytes (GR), and monocytes (MO). Data was assessed via between-subjects repeated measures ANOVA on group and time. RESULTS: Sex differences were observed in LY% and GR%, such that, in men, LY% was elevated at IP, suppressed at 1H, and recovered at 24H. In women, LY% was suppressed at 1H and recovered by 24H. In men GR% was suppressed at IP, elevated at 1H, and recovered at 48H. In women, GR% was elevated at 1H but recovered by 48H. CONCLUSION: Women appear to exhibit delayed immune response. Future research should explore fluctuating hormone differences and response to exercise.

Angela Caruso, Senior, Exercise Science (Pre-Physical/Occupational Theraphy/Podiatric Medicine)
Jay Jonas, Other, Athletic Training
Mentor: Angela Ridgel, Ph.D.

The Effect of High-Cadence Cycling on Proprioception in Individuals with Young Parkinson's Disease and Young Adults

The purpose of this study is to determine if a single bout of high-cadence cycling can improve joint position sensitivity in individuals with Parkinson's Disease. Both young adults and individuals with Parkinson's Disease completed a single session of high-cadence cycling. Joint position sensitivity was measured before and after each session. Young adults and individuals with Parkinson's Disease showed similar performance in joint position task and less accuracy in the non-dominant leg. These findings suggest that a single session of cycling was not sufficient to promote changes in proprioception. However, future studies will examine the effects of multiple sessions of high-cadence cycling on proprioception.

"No research without action, no action without research"
– Kurt Lewin

Kaileigh Christy, Senior, Athletic Training
Mentor: Adam Jajtner, Ph.D.

Comparison of Menstrual Phases on Force Recovery After Resistance Exercise in Trained Women

PURPOSE: To investigate differences between follicular (FOL) and luteal (LUT) phases on force production after resistance exercise. METHODS: Women completed a squat protocol and varying performance tests throughout recovery. Participants could squat body weight, took oral contraception, and had regular menstrual cycles for 6 months. Data was analyzed via Mixed Model Regression with group and time as fixed factors. RESULTS: Interactions were observed in PF and force at 100ms and 200ms, such that LUT recovered force measures before FOL. CONCLUSIONS: Coaches should consider the menstrual phases in women to improve performance outcomes due to force recovery in each phase. To understand phase differences, future research should investigate recovery from varying volumes of exercise.

Caitlin Holland, Senior, Exercise Science (Pre-Physical/Occupational Theraphy/Podiatric Medicine)
Younguk Kim, Other, Exercise Science (Exercise Physiology)
Tiffany Teubert, Senior, Exercise Science (Exercise Physiology)
Haverly Watson, Senior, Exercise Science (Pre-Physical/Occupational Theraphy/Podiatric Medicine)
Mentor: Angela Ridgel, Ph.D.

Gait Characteristics in Individuals with Parkinson's Disease and Healthy Young Adults

The purpose of this study was to compare gait metrics of Parkinson's disease (PD) patients both on and off levodopa with healthy adults. Healthy adult gait metrics were compared to previously published data from 52 PD patients both on and off medication. Arm metrics were greater in healthy adults compared to individuals with PD both on and off medications. Double support time was lower in health adults compared to PD. Cadence showed the smallest difference between individuals with PD and healthy adults. Levodopa improved arm peak velocity ($p=<0.001$), arm ROM ($p=<0.001$), and cadence ($p=0.001$), but not double support time ($p=0.425$) in individuals with PD. This data shows that gait metrics can be used to analyze differences in gait patterns between individuals with PD and healthy young adults.

Joel Monts, Senior, Exercise Science (Exercise Physiology)
Mentor: Adam Jajtner, Ph.D.

Leukocyte Response Following High Intensity Interval, Sprint Interval, and Moderate Intensity Continuous Exercise

Purpose: To observe leukocyte response following cycling. Methods: Recreationally active men completed three randomly ordered, time-matched trials: high-intensity-intervals, sprint-intervals, and moderate-continuous exercise. Participants completed a criterion graded VO2max test and returned 72 hours later for trials. Blood was collected before exercise and throughout 24 hours of recovery. An automated hematology analyzer quantified differential leukocyte counts. Data was analyzed via mixed-model regression. Results: Lymphocytes demonstrated interactions at two time points. Leukocytes displayed biphasic response with elevations followed by suppressions. Monocytes and granulocytes demonstrated a time effect with differing patterns of elevation and suppression. Granulocytes and monocytes returned to baseline by 24 hours, whereas lymphocytes remained suppressed at 24 hours. Conclusion: Intensity and total work appear to affect leukocyte response.

Ciara Slusser, Senior, Exercise Science (Exercise Physiology)
Mentor: Adam Jajtner, Ph.D.

Comparison of Circulating Leukocyte Ratio Between Follicular and Luteal Phase Following Resistance Exercise

PURPOSE: To evaluate differences in leukocyte (WBC) responses between follicular (FOL) and luteal (LUT) phase following resistance exercise. METHODS: Thirteen resistance trained women completed a muscle-damaging protocol (8x10, 70%1RM) during opposing menstrual phases. Data was assessed using a repeated measures ANOVA on group and time. RESULTS: Expected time effects were observed for WBC counts, LY%, MO%, and GR%. At IP and 1H, WBC was elevated. At 1H, LY% was suppressed and GR% was elevated. At 24H and 48H, MO% was elevated. CONCLUSION: Given the trend toward group effect in LY%, future research should explore LY responses after exercise between menstrual phases.

Nikola Tomic, Senior, Exercise Science (Pre-Physical/Occupational Theraphy/Podiatric Medicine)
Mentor: Adam Jajtner, Ph.D. & Emily Tagesen, Graduate Student

A Comparison of Sex Differences on Force Production Following Resistance Exercise

Purpose: To investigate sex differences on force recovery following resistance exercise. Methods: Seven men and five women performed a squat protocol and performance tests throughout 48 hours of recovery: vertical jump (VJ) and isometric mid-thigh pull (IMTP) to assess force production. Data was analyzed via mixed-model regression. Results: Men exhibited greater performance detriments after exercise and through recovery, demonstrated through VJ height, IMTP RFD and PF. Women experienced decreased peak force production at 1H and 24H, but recovered before men. Conclusion: Force and power production after exercise demonstrated sex differences. Coaches should consider sex differences when implementing programs.

Melani Whitmyer, Senior, Biology (Pre-Medicine/Pre-Podiatry/Pre-Dentistry)
Caitlin Holland, Senior, Exercise Science (Pre-Physical/Occupational Theraphy/Podiatric Medicine)
Brittany Smith, Other, Exercise Science (Exercise Physiology)
Mentor: Angela Ridgel, Ph.D.

Entropy of Power and Cadence Across Stiffness Levels on a SmartBike

Parkinson's Disease (PD) is a neurological disorder that causes tremors and slowness of movement. However, exercise has been shown to greatly decrease these symptoms. The SMART (Speed Manipulated Adaptive Rehabilitation Therapy) bike is a motorized stationary bicycle that provides dynamic motor assist to decrease the symptoms of PD. The purpose of this study is to determine how the different stiffness levels impact the entropy of cadence in young healthy adults. Participants rode the bike at 80 RPMs for 5 minutes at 6 different stiffness levels. Entropy of cadence increased with greater stiffness. Understanding how stiffness affects the entropy of cadence is important for prescribing appropriate exercise therapy for individuals with PD. Future studies will use these findings to optimize improvement in neurological disorders.

Fashion Design and Merchandising

Posters

Amirah Shupe, Sophomore, Fashion Design
Mentor: J.R. Campbell, Ph.D.

Breaking Boundaries and Inspiring Cross-Collaboration with Design Innovation

Kent State's Design Innovation makerspace encourages students to become intersectional problem-solvers and fearless collaborators. This research aims to inspire students to take advantage of the space while strengthening their ability to participate in effective cross-collaboration. Through investigation, it is noted that many college students struggle with the belief that they are not capable or worthy of engaging with those who study different topics or are seemingly more knowledgeable than them. Alongside research regarding how to alter this way of thinking, we have worked on the development of various "pop-up experiences." By bringing forth skills with seminars, workshops, and events, we have noted newfound confidence and inspiration alongside increased student ability to collaborate efficiently in their academic and professional careers.

Natalie Steenbock, Senior, Fashion Merchandising
Mentor: Catherine Amoroso Leslie, Ph.D.

Effects of Industry Guest Speakers on Students

The purpose of this study was to examine the effect fashion industry guest speakers have on student engagement and learning. The research explored how students reacted to having a Q&A session with successful professionals, connections with course material, and if subsequently they took any professional development actions to further their own future career. The research included a survey that collected feedback and perceptions from students after the Q&A session as well as impact on their future career goals. Students reported they learned how to better network, the best ways to apply for employment opportunities, and how to improve forecasting skills. This study adds to our knowledge of benefits and influences of integrating successful professionals in the learning experience.

"Fashion is the science of appearances, and it inspires one with the desire to seem rather than to be"
– Michel Eyquem de Montaigne

Brianna Vonderau, Senior, Fashion Merchandising
Mentor: Mourad Krifa, Ph.D.

Consumer Clothing Disposal and Biodegradability Values

The greatest issue facing the fashion industry today is sustainability, as consumers are now aware of sustainability while making purchasing decisions. A great issue present is the disposal of garments, as many end up in landfills or incinerated. However, a simple solution to this problem is to recycle, reuse, and use biodegradable materials. Cotton, a natural fiber, is both biodegradable and very durable, allowing for it to be recycled into other fabrics. However, before companies advertise their sustainable use of cotton, it is important to understand the value consumers see in sustainable disposal, as well as to understand their current disposal habits. I am studying the views U.S. consumers have on cotton garments, connected to their disposal habits and views on sustainability.

Angelique Wong, Senior, Fashion Design
Mentor: Margarita Benitez, M.F.A.

Undergarments for Breast Cancer Patient Recovery: Mental and Physical Support

Fashion's epicenter has always been the portrayal of bodies in the best and most creative way possible. This understanding is an open description of what the right garments can do for different occasions. Fashion and women have for a long time been associated with grace, class, style, personality, and so much more. Many women who suffer from breast cancer take not only physical blows but mental ones as well. Fabrics that combine functionality and fashion, when being used to construct undergarments for mastectomy patients, can lead to improved physical and psychological health in recovery. Creating reliable and comfortable undergarments allows patients to regain their sense of identity and improve quality of day-to-day life.

Geology/Geography/History

Posters

Annika Dudik, Junior, Geology
Chloe Heestand, Junior, Geology
Mentor: Anne Jefferson, Ph.D.

How Does Flexible Anthropogenic Litter Move in Streams?

The improper disposal of anthropogenic litter interferes with the natural ecosystems in rivers and streams in various ways. These include the entanglement and ingestion of the debris, exposure to harmful chemicals, modification of the natural habitat, and the quality of food. Anthropogenic litter can have a variety of different sizes, shapes, and density in comparison to natural materials within streams. These movements are not accurately predicted by existing sediment transport formulae. To fill this knowledge gap, the critical shear stress required for incipient motion of an object has been determined in a laboratory flume. The orientations of flexible objects, as well as the flume slope and roughness varied. In each experiment, water flow in the flume slowly increased and incipient motion was recorded.

Makayla Kearns, Junior, Environmental and Conservation Biology (Conservation Biology)
Mentor: Anne Jefferson, Ph.D.

Patterns of Macro-litter on a Lake Erie Urban Beach and in an Adjacent Tributary

Urban streams and beaches may be major sources for plastic debris plaguing Great Lakes coastlines. Our goal is to examine the physical and human activity drivers of litter variability on Great Lakes beaches to better manage and predict pollution. Our case study focused on macro-litter (>5 cm) on a Lake Erie beach and adjacent tributary stream in Cleveland, Ohio. In the field, ten beach and ten stream transects in two reaches were repeatedly sampled between May and September 2021. In the two streams, the commercial area upstream reach had more litter. At the beach, the Tuesday after Memorial Day had the highest litter content. Transects near the easiest beach access had the most macro-litter, but smaller (<5 cm) litter was more evenly distributed. The dominance of human activities affecting litter patterns emphasizes the need for other experiments on how weather, tributary inputs, shoreline geometry, and coastal engineering affect litter distribution.

Alexis Mitchell, Junior, Physics (Research)
Makayla Kearns, Junior, Environmental and Conservation Biology (Conservation Biology)
Mentor: Anne Jefferson, Ph.D. & Tim Gallagher, Ph.D.

Identification of Different Meso-Plastics in Lake Erie Beaches

Due to the growing rate of plastic found in water and beaches, sediment samples were taken from a beach in Cleveland, Ohio. The samples are then counted and any man-made objects found in the sediment are saved and recorded. Then the fourier transform infrared (FTIR) was used to scan the plastics and produce a spectrum. 78 objects got scanned in the FTIR and are being identified using another software. This works by comparing the spectra from the FTIR scan to pre-saved scans in the database library and gives different percentages of different materials to identify what type of plastic the sample is. There is not enough data identified yet to come to a conclusion of what percentage of different plastics are found in the beaches.

Seth Rainey, Senior, Geography (Environmental Geography)
Mentor: Aimee Ward, Ph.D.

Transportation and Well-Being: Assessing the Association Between Mode Choice and Life Satisfaction in Kent, OH

Transportation mode affects well-being, and research suggests that active transportation generally leads to higher life satisfaction when compared to passive transportation. This research examined the association between transportation mode and subjective well-being using a survey that assessed transport-use behaviors and quality of life in the Kent State University community. Results concur with past work; and interviews with skateboarders shed light on the physical, mental, and social benefits of skateboarding that could reasonably be attributed to other forms of active transportation because of increased interaction with other people and the environment. Finally, the findings from both the surveys and interviews have indications for policy and practice in Kent, and generalizations can be made for other college town urban landscapes.

Sally Saindon, Senior, History
Mentor: Matthew Crawford, Ph.D.

Mining Maps from Colonial Peru

By the 1780s and 90s, the silver mining industry in colonial Peru was experiencing a dwindle in output, resulting in the Spanish Crown taking a renewed interest to increase the revenue garnered from these operations. Mining maps from this time depict this interest by the increase in their creation and they show what was deemed important to visually display to government officials and the Spanish Crown. These maps convey a visual understanding of how their creators wanted those viewing the maps to see the silver mining occurring under colonial rule, with them having the power to leave out or minimize information and instead solely focus on the production and profit of silver.

Patrick Shaw, Senior, Geography (Social Geography)
Jordin Eurenius, Senior, Geography
Megan Neutzel
Alexander Pratt, Senior, Geography (Environmental Geography)
Seth Rainey, Senior, Geography (Environmental Geography)
Kelli Robinson, Senior, Geography (Environmental Geography)
Mentor: Jennifer Mapes, Ph.D.

Land Use Change on the Kent State Campus (1910-2022): The Ever-Changing Landscape and Fast-Paced Development of College Towns

As historically rural areas in America continue to become more urbanized, it is important to understand the effects land use changes have on the ecosystem. The aim of this project was to determine how the land within the current boundaries of Kent State University has changed from 1910-2022 in order to better understand the evolution of campus. We will be looking into previous research on the trees and wetlands around campus, taking tree ring cores of the campus trees to determine their age, and using historical documents such as maps and student newspapers to show and explain the changes over time. The expected findings consist of a rapid shift from agricultural land to a densely populated land and a dramatic reduction in “natural” spaces.

Madison Wood, Senior, Geology (Environmental Geology)
Mentor: David Singer, Ph.D.

Lead (Pb) in Urban Soil

Lead (Pb) is commonly found in urban soils because of its wide range of industrial uses and its resistance to degradation. The risk of Pb exposure is based on its speciation (chemical form) in soils, which can be determined by Scanning Electron Microscopy with Electron Dispersive Spectroscopy (SEM-EDS). The combination of SEM imaging and EDS element mapping can be used to identify Pb and other elements present, which can assist in understanding the phases with which Pb is associated. X-ray Fluorescence (XRF) can be used to determine the elemental composition of a sample. This project looks to identify the speciation and concentration of Pb in soils as a function of distance from a home and roadway using the above-mentioned methods of analysis.

Nursing

Posters

Nicole Grosel, Sophomore, Nursing
Holly Brownsberger, Sophomore, Nursing
John Cmok, Sophomore, Nursing
Mentor: Diana Fleming, Ph.D.

How to Improve the Virtual Support Group Experience for People Living with Lupus

The purpose of creating this survey is to obtain information on how we can improve the support group experience for people living with lupus (PLWL) in the virtual environment. Creating the survey required several group brainstorming sessions with our mentor in order to form a purpose and derive specific questions to ask our sample. The questions will be placed in a Qualtrics survey to be electronically delivered to a group of PLWL to gain an understanding of PLWL perceptions on their experiences with virtual support groups. Results from the survey will be used to improve the virtual support group experience for PLWL. The convenience sample to be used are members of the Lupus Foundation of America, Greater Ohio Chapter.

Cassia Lavy, Sophomore, Nursing
Matthew Church, Sophomore, Nursing
Caleb Faust, Sophomore, Nursing
Paul Thrams, Sophomore, Nursing
Mentor: Denice Sheehan, Ph.D. & Kristen DeBois, Ph.D.

Understanding how Young Adult Friends (YAF) Experienced and Managed their Relationship with their Friend whose Parent Died when they were an Adolecent

Introduction: Approximately one third of college students have lost at least one family member or friend in the past year. It is crucial to understand how YAFs experienced and managed their relationship with their friend whose parent(s) died when they were an adolescent. Methods: This is a mixed-methods study using quantitative and qualitative data. The sample size is 10 participants. Qualitative descriptive methods will be used to understand the relationship between the YAF and their friend whose parent died when they were an adolescent. Results: Pending findings Discussion: Pending findings

"Stem cell research can revolutionize medicine, more than anything since antibiotics" – Ron Reagan

Taylor Monturo, Sophomore, Nursing
Melina Connell, Sophomore, Nursing
Mia Murphy, Junior, Nursing
Mary Vavruska, Sophomore, Nursing
Mentor: Jo Dowell, Ph.D.

MDI Spacer Chee Sleeve: A Prototype to Decrease the Risk for Misplacement

Introduction: Families who have children with asthma face consequences due to inaccessibility to metered dose inhaler (MDI) spacers. To combat this issue, this study will include the development of a new prototype for easier access and decreased misplacement and cost of the spacer. Methods: This intervention study will include development of a stretchable material surrounding the barrel of the MDI spacer, which also features a key ring that could attach to keys and purse for increased accessibility. Honors students and PI will recruit 10 mothers within the Kent State University community who have children with asthma. They will follow-up in two weeks to gather feedback. Analysis: the team will analyze the feedback for usability and make changes. Keywords: MDI spacers, usability, and inaccessibility.

Jillian Netzel, Sophomore, Nursing
Sara Peterson, Sophomore, Nursing
Mentor: Dana Hansen, Ph.D.

Nursing Student Self-Care Survey

Introduction: The goal of this project is to understand better ways to support nursing students in managing their stress. Methods: Nursing Honor students conducted a cross-sectional survey in which they identified the correlation between practicing self-care and CON students' overall wellbeing. Results: Descriptive and inferential statistics were utilized to compare mental health and various factors. Most students already practiced self-care regardless of these factors. The majority of students think self-care should be mandatory. The only statistically significant finding was the type of self-care activity preferred. Periods of movement during class and study time was the most requested activity to improve mental health. Discussion: These findings will help the college of nursing identify future self-care curriculum or activities.

"Scientific research is one of the most exciting and rewarding of occupations."
-Frederick Sanger

Isabella Oliver, Sophomore, Nursing
Mentor: Dana Hansen, Ph.D.

CarEOL Project

Nursing Students and Final Conversations: Catalyzing Relationships at the End of Life (CAREol) Introduction: The CAREol program is interdisciplinary curriculum that incorporates several aspects of final conversations. One aspect of interest is that of spiritual and religious views of nursing students regarding attitudes and perceptions about the end of life (EOL). The purpose of our analysis was to explore nursing students view their own attitudes and perceptions towards death and dying. Methods: For this analysis, descriptive qualitative methods were utilized. Results: Preliminary results identify themes of connections, meaning, dying with dignity/closure, and beliefs. Discussion: Through reflection, nursing students struggle to relate to death's finality, indicating potential anxiety sources regarding EOL care. However, by reflecting on personal beliefs, students begin understanding importance of patient and family final conversations and the nurses' facilitation role.

Madison Pipes, Sophomore, Nursing
Hannah Cochran, Sophomore, Nursing
Grace Heilmann, Sophomore, Nursing
Alexandra Pishkula, Sophomore, Nursing
Lauren Skidmore, Sophomore, Nursing
Mentor: Kimberly Cleveland, J.D., MSN, R.N., C-MBC; Joel Hughes, Ph.D. & Anthony Vander Horst, Ph.D.

COVID-19 Follow Up Study: No Statistical Difference in Nursing Student Anxiety During COVID-19 Pandemic When Compared to Non-Health Related Majors

Introduction: Earlier in the COVID-19 pandemic, nursing students reported lower levels of anxiety compared to non-health majors. Purpose: The purpose of this study was to compare anxiety scores of nursing majors to non-health related majors 18 months after the initial study completed in 2020. Methods: We conducted a follow-up survey 18 months after the initial survey and assessed anxiety using the PROMIS emotional distress short forms v 1.0. Results: Mean anxiety scores were lower among nursing majors than non-health related majors. However, the difference was not statistically significant. Conclusion: Further data analysis is required to determine why nursing student anxiety scores were lower and not statistically different from non-health major students.

"Research is what I'm doing when I don't know what I'm doing"
– Wernher von Braun

Physics/Chemistry/Liquid Crystal

Oral Presentations

Delonte Goodman, Senior, Mechatronics Engineering
Mentor: Antal Jákli, Ph.D.

Ionic Liquid Crystal Elastomer Based Organic Electrochemical Transistors Containing Non-Phase Separating Liquids

Organic electrochemical transistors (OECTs) have greatly expanded the applications and use of electronics due to their unique traits. Since their inception, OECTs have only gained more prominence for their incomparable properties of flexibility and biocompatibility. Recent innovations in technology such as foldable electronics incorporate these traits using liquid crystal elastomers (iLCEs). The iLCEs in these transistors allow for more degrees of freedom and deformation in systems such as soft robotics. This paper focuses on the properties of iLCE based OECT, where the iLCE consists of non-phase-separated ionic liquids. Finally, this paper discusses additional electrical properties, such as mechano-electric behavior, steady-state behavior, and electric output characteristics.

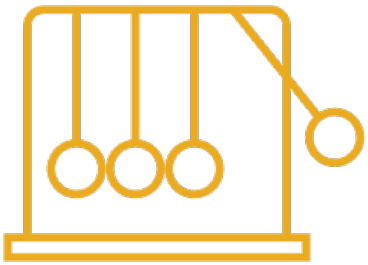
Physics/Chemistry/Liquid Crystal

Posters

Tyler Betters, Sophomore, Chemistry
Mentor: Yaorong Zheng, Ph.D. & Man Kshetri

Near-Infrared (NIR)-Activatable Platinum-Based Anti-Cancer Agents

Platinum-based anticancer agents usage has been limited due to side effects and drug resistance. Our new Pt(IV) compounds can be activated by using near-infrared (NIR) irradiation, which eliminates toxicity of classic treatments. Upon NIR irradiation, release of both DNA damaging Pt(II) and mitochondria-damaging moieties occurs, which overcomes drug resistance. The Pt(IV) prodrug contains two “axial” ligands. The Pt(IV) compounds are kinetically inert and lack anticancer activities. One of the axial ligands is a NIR dye, which absorbs NIR light (805 nm). Photoinduced electron transfer occurs to release the Pt(II) products. In the experiments, we synthesized the Pt(IV) prodrugs, and tested the photoactivation mechanism, NIR-controlled anticancer activity, nuclear DNA damage, and mitochondrial dysfunction triggered by the Pt(IV) prodrug.



“The study of physics is also an adventure. You will find it challenging, sometimes frustrat-ing, occasionally painful, and often richly reward-ing” – Hugh D. Young

May Cheline, Sophomore, Chemistry
Mentor: Yaorong Zheng, Ph.D.

Use of Platinum-based Organometallic Complexes to Bypass Drug-resistant Ovarian Cancer

Traditional cancer treatments involving platinum-based drugs are becoming ineffective at treating ovarian cancer. This rise in resistant ovarian cancer cells is due to the upregulation of the transmembrane protein CD36, which ingresses fatty acid structures. Although this has become a challenge for traditional chemotherapy, it has become the source of a new vulnerability. The pseudo-fatty acid is comprised of a long carbon chain which is to resembles the fatty end of the fatty acid, the platinum drug in the center, and an end that could be customized. After assessing many different pseudo-fatty acids, where the customizable end was a different polarity, it was discovered A prodrug with certain polarity was highly effective toward resistant strain of ovarian cancer as compared to a similar structure with no polar component.

Colin Green, Senior, Physics (Applied Mathematics)
Mentor: Carmen Almasan, Ph.D. & Alex Konic, Ph.D. Student

The Study of Materials Behavior at Low Temperatures

The primary research being performed was cooling materials, cage compounds PrNi2Cd20 and PrPdCd20, to temperatures lower than four degrees kelvin to detect changes in heat capacity. This change in heat capacity when studied could indicate a phase transition, being when material properties begin to change caused by a rearrangement of the atomic structure of the compound. These transitions can give us information on the electronic structure of the material, which governs the various properties of the substance. Performing these tests multiple times reveals patterns of behavior in various materials allowing them to be categorized and studied to understand what forces are governing these behaviors.

Garrett Hartley, Junior, Physics (Chemistry)
Mentor: John West, Ph.D.

The Application and Analysis of Liquid Crystals on Fibers and Fabrics

The research which I have been conducting at the advanced materials and liquid crystal institute has been over the application of liquid crystals on fibers and fabrics. The goal of this project is to develop smart sensors, medical fabrics, and color changing clothing. I was specifically tasked to analyze how liquid crystals interact with different fibers and fabrics at low volumes to gather baseline data. To do this, I developed a setup, quite similar to those used by people in the textile industry to test water proofing abilities, to administer the liquid crystals onto textiles in a way that characterized them by absorbance, weight capacity, and capillary motion.

"Wonder is the heaviest element on the periodic table. Even a tiny fleck of it stops time" – Diane Ackerman

Holly Mathews, Senior, Physics (Research)
Hend Baza, Other, Physics
Mentor: Oleg Lavrentovich, Ph.D.

Controling Speed of Bacterial Active Droplets in a Nematic Environment

Controlling the chaotic dynamics of microswimmers such as flagellated bacteria would open technological opportunities in biomedicine and micro-robotics. One method is to use liquid crystals to guide these microscale dynamics. An aqueous droplet loaded with bacteria B. Subtilis shows unidirectional self-propulsion when suspended in a uniformly aligned liquid crystal. Here, we study how to optimize the droplet's speed by changing the viscosity of the droplet's medium. The viscosity is controlled by adding a small amount (0.05-0.5 wt.%.) of a non-toxic polymer carboxymethyl cellulose (CMC). We first studied the effect of viscosity on individual bacteria speed, then on the droplets speed and we found that using liquid crystal media with small viscosity, and using a media that optimize the individual bacteria speed are the conditions to optimize the droplets speed. The research is supported by NSF grant DMR-1905053.

Victoria Menches, Senior, Biochemistry (Chemistry)
Mentor: Farid Fouad, Ph.D.

Synthesis of Unsymmetrical Diaryl Selenides for Sensitive Electrocatalytic Detection of Peroxynitrite

In this work we demonstrate the synthesis of unsymmetrical diaryl selenides with an amino function group at position four. The amine moiety enables grafting of the diary selenide on graphite for electrochemical determination of peroxynitrite. Substituent electronic effect on the sensitivity of peroxynitrite detection is studied. We have established a sensitive and accurate electrochemical analytical tool based on grafted organoselenides on graphite to detect PON in a quantitative manner. Synthetic routes utilized to make target unsymmetrical diaryl selenides are potassium iodate, KIO3 catalyzed coupling of electron rich arenes with diselenides; and silver nitrate catalyzed arylboronic acid diaryl diselenide cross-coupling reaction.

Erica Sitch, Senior, Chemistry (Biochemistry)
Mentor: Scott Bunge, Ph.D.

Structural Determination of Heteroligated Zinc Complexes

Zinc is an essential element which plays an integral role in many biological processes including DNA stabilization, immune function, and cell proliferation. The biological relevance of zinc makes it a subject of interest in immune supplements and drug design. Because structure and function are inextricably linked, it is essential to determine the structure of synthesized compounds before practical applications of such compounds can be tested. The goal of this research is to synthesize and obtain structural data for different zinc coordination complexes to better understand and predict the potential uses of zinc complexes. By creating different complexes with a variety of biologically relevant ligands, such as thiols and alcohols, the structural effects of these variable groups can be examined and related to potential functions.

Amberly Stevenson, Junior, Chemistry
Mentor: Jefferey Mighion, Ph.D.

The Synthesis of Kaurenoic Acid, a Bacteria-Resistant Drug and Drug Precursor

Kaurenoic acid, a drug isolated from the sunflower plant, is able to be used in the medical field in numerous ways. However, isolating the compound from sunflowers is costly and produces a low yield of final product. Stevioside was utilized as a precursor to access kaurenoic acid. This synthesis can provide kaurenoic acid in a more efficient and accessible manner. Kaurenoic acid could then be utilized in the initial steps of the synthesis of platensimycin, a drug used to treat tuberculosis and staphylococcal infections. Synthesizing kaurenoic acid and other diterpenoid derivatives on a large-scale allows for a greater overall production of the drug.

Jiale Xie, Junior, Chemistry (Biochemistry-Pre-Medicine/Pre-Osteopathy/Pre-Dentistry)
Mentor: Sanjaya Abeysirigunawardena, Ph.D.

N6-methylation (m6A) can Exert an Evolutionary Pressure Depending on its Location in RNA Secondary Structures

RNA pull down assays were conducted using two RNA constructs with a stem-loop structure to identify novel readers and their modes of recognition. The proteins bound specifically to each construct were identified using mass spectrometry. There were 274 proteins illustrated higher affinity towards the model hairpin RNA with m6A modification in the stem region compared to when the modification is present in the loop. Out of this pool of protein, 119 were RNA binding proteins. On the other hand, there were 36 proteins which had more affinity towards the hairpin RNA with m6A modification in the loop construct. Among these proteins, 12 were RNA binding proteins and one of them was a known m6A reader.

Political Science/Philosophy/History

Oral Presentations

Moira Armstrong, Senior, English and History
Mentor: Molly Merryman, Ph.D.

Queer Pandemic: Resilience in Times of Crisis

Queer Pandemic: Resilience in Times of Crisis is an oral history project documenting the experiences of LGBTQ+ people in the United Kingdom during COVID-19. The oral histories cover biographical information, experiences during COVID-19, the impact of queerness on those experiences, and the government's actions. So far, 35 interviews have been completed and the project is ongoing. The results will become a part of Queer Britain's Virtually Queer collection and an exhibit at the opening of Queer Britain's physical museum space. This presentation will provide a brief overview of the goals and process of the Queer Pandemic project and briefly describe two key themes that have emerged from the interviews conducted so far: isolation from queer community and connections between COVID-19 and the AIDS crisis.

Professional Practice/Outreach/Engagement

Oral Presentations

Meredith Blair, Sophomore, Political Science (American Politics)
David Dobransky, Freshman, Computer Science
Abigail McElhaney, Freshman, Architecture
Allison Stark, Freshman, Exploratory
Tessa Moats, Freshman, Psychology
Tori Hockenberry, Freshman, Geology
Miranda Hanavan, Freshman, Advertising
Mentor: Celeste Dawson, Graduate Student & Johanna Voznak, Graduate Student

Quality Food in a Flash

For our project, we are choosing to focus on filling the empty vendor space in the Student Center Hub. After hearing several complaints from the student body about a lack of food options, we are looking to find a resolution that offers a larger variety to students. To do this we will be working with Culinary Services and the Undergraduate Student Government Dining Committee. We will start by completing a survey to assist in getting input from students. Our main goal is to add a space to campus that will benefit both the university and the student body. In conclusion, this project will not only satisfy the student body but also contribute to helping the University and Culinary Services.

Isabella Carde, Junior, Early Childhood Education
Caitlyn Mularchik, Freshman, Early Childhood Education
Ash Campbell, Freshman, Digital Media Production & Theatre Studies
Cheyenne Konkel, Junior, Exploratory
Laney Beaghley, Freshman, Zoology
Nicole Warnement, Sophomore, Interior Design
Mentor: Celeste Dawson, Graduate Student & Johanna Voznak, Graduate Student

Black Squirrel Bulletin

Black Squirrel Bulletin is a project designed to make on-campus resources more widely accessible to all Kent State students. There are many useful services on campus that most students are simply not aware of. Black Squirrel Bulletin will gather a database of these services, and as a new addition to the Kent State App, provide students with a bulletin from which to discover those that might be useful. We will work with the development team of the Kent State App, the SDI department as a whole, and involve student developers and tech majors. Navigating the finer workings of college can be difficult for students. With Black Squirrel Bulletin, we hope students will more easily locate the resources necessary for them to succeed.

Kevin Bahner, Junior, Computer Information Systems
Malina Andamasaris, Freshman, Public Relations
Lacey Beaghley, Freshman, Zoology
Hayden Cruz, Freshman, Journalism
Katherine Fry, Freshman, Art Education
Katie Glenn, Freshman, Fashion Merchandising
Lauren Korpics, Freshman, Early Childhood Education
Angel Guinn, Sophomore, Mechatronics Engineering
Audrey Sargus, Freshman, Middle Childhood Education
Gregory Singleton, Freshman, Business Management
Riley Wolfe, Freshman, Marketing
Mentor: Celeste Dawson, Graduate Student & Johanna Voznak, Graduate Student

Eastway Bowling Alley

At Kent State, there is no central activity that is constant for students. There are clubs; but not every student has a schedule that can accommodate club meetings. Having a bowling alley, on the other hand, will bring our community together. Having a place where the community can meet will impact the overall wellness of our community. Jill Jenkins and Mike Wasowski are our direct contacts with the bowling alley willing to step in and make this happen. Overall at Provost Leadership Academy, we feel that we have a limited type of ways to socialize and be active on campus. It's not possible for every student to travel off the Kent campus, which is why we feel it's important to re-open the bowling alley to grow community.

Kiara Harrison, Freshman, Education
Marcus Amador, Freshman, Zoology
Colin Fitz, Freshman, Psychology
Helana Graham, Freshman, Architecture
Amya Liburd, Freshman, Fashion Design
Julia Mueller, Sophomore, Managerial Marketing
Veronica Pritt, Freshman, Exploratory
Alexander Zito, Freshman, Public Relations
Mentor: Lexi Valentino

Dining Technology Advancements

Psychology

Oral Presentations

Kasey Jamison, Senior, Psychology
Mentor: Rachael Blasiman, Ph.D.

Long-Term Effects of Study Skills Workshops within the Rising Scholars Program

The Rising Scholars Program is a K-12 mentoring program offered at every Kent State University campus. Workshops provide career exploration opportunities, community involvement, and college readiness support. In this study, we assess the short-term and long-term impact of one workshop aimed at improving study habits. We hypothesized that scholars' knowledge of good study habits would improve post-workshops. Also, we hypothesized that mentors would also find value in the workshops on their own personal study habits. Using archival data taken from scholars pre- and post-workshop, as well as qualitative interviews with mentors, we found significant improvement in knowledge of effective and ineffective study habit techniques (N = 99). Mentors recalled the workshop as helpful, and provided suggestions to refine and improve this workshop in the future.

Thomas Kornbau, Senior, Psychology
Mentor: Rachael Blasiman, Ph.D.

Daily Habits, Screen Time, and Productivity

This study was an online survey from Qualtrics and posted on the regional campus SONA system. The survey collected demographic information, questions about cell phone and social media use, and questions about daily habits, exercise, sleep, and work. The survey also included measures of stress, self-esteem, self-efficacy, and productivity. I hypothesized there would be a negative correlation between screen time and mood. As expected, screen time usage was positively correlated with aggressive mood.

"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

Psychology

Posters

Shannon Aber, Senior, Psychology
Karen Wetzel, Other, Psychology
Mentor: Mary Himmelstein, Ph.D.

Weight Stigma Processes in Reproductive Care: The Role of Selfless Caregiving

Few studies examine weight stigma in reproductive healthcare, despite the salience of the body in this context. It is unclear how weight stigma (being devalued for weight) might be related to health-relevant self-stigma (blaming oneself for health conditions because of weight) or how selfless caregiving (putting others' needs above one's own) might be related to stigma processes. This study examines weight stigma in reproductive healthcare, health-relevant self-stigma, and selfless caregiving using a national sample of women. We hypothesize that selfless caregiving will moderate the relationship between weight stigma in reproductive care and health-relevant self-stigma. Specifically, we expect the relationship between these variables to grow stronger as women score higher in selfless caregiving. Understanding stigma is essential for improving the negative effects of stigma in healthcare.

Teghan Boggs, Junior, Psychology
Olivia Coontz, Junior, Psychology
Blaine McCurdy, Sophomore, Psychology
Mentor: Rachael Blasiman, Ph.D.

An Investigation of Notetaking Habits in Undergraduate Students Before and During the Pandemic

In this study, we examine changes over the past two years in student notetaking habits. We hypothesized a) that students not only take fewer and less thorough notes in online courses, but that learning during the pandemic has exacerbated this habit; b) students who frequently doodle on their notes have higher GPAs and higher levels of conscientiousness; and c) students who take multi-colored notes have higher GPAs and greater self-efficacy. Data collection is ongoing, but initial analyses fully support the first hypothesis and partially support our second and third hypotheses. Additional exploratory analyses are also reported.

"The purpose of psychology is to give us a completely different idea of the things we know best" – Paul Valery

Sarah Colditz, Senior, Psychology
Mentor: Christopher Was, Ph.D.

Mind Wandering: The Relationship Between Thought Probes and Interests

An interest in a topic can greatly impact the amount an individual mind wanders. The less interested a student is in a particular subject, the more they mind wander. But what if administering probes will put the individual back on task resulting in better retention of the material? The goal of this study is to determine if high interest and low interest are negatively or positively affected when administered thought probes. In this study participants will be presented with five topics which they will rank in order from most to least interesting, with only the highest and lowest being presented in video format to the participant. At the end of each video participants will fill out a 10-question test on what they remember in the video.

Charlie Coward, Senior, Psychology
Mentor: Daniel Cole & John Updegraff, Ph.D.

The Self and the Divine: Establishing Relationships between Personality and Religion in Regard to Mask-Wearing Behavior

The COVID-19 pandemic continues to be a serious public health crisis around the world. Despite the regulations recommended by the Centers for Disease Control and Prevention, there seems to be a considerable number of people who choose not to wear a face mask in the United States. Previous literature displays several demographic factors that affect mask wearing behavior; however, fewer studies have specifically investigated the effects of religion and personality on mask wearing behavior. The purpose of the current study is to investigate the relationships between religion and personality with face mask behavior in the context of COVID-19. The sample includes 850 undergraduate students enrolled at Kent State University who completed a survey containing measures related to demographics, personality, and face mask wearing.

Kassidy Dagnen, Freshman, Psychology
Mentor: Maren Greve & Christopher Was, Ph.D.

Mind Wandering and the Number of Tasks

Each condition has mind-wandering probes. We use the OSPAN task, edited to have mind-wandering probes appear through the experiment. We use a video lecture, also edited to have the mind-wandering probes. In prior studies, we found evidence of the type of influence the task has on how the number of mind-wandering probes affects the degree of mind wandering reported with the task. We came to the hypothesis of the interaction between a number of mind-wandering probes and the type of task involved was a factor that involved mind wandering. They include task differences which may explain the opposite direction of mind wandering found in our previous studies. Participants who had received more mind-wandering probes were more likely to mind wander during an OSPAN task but less likely to mind wander during a video lecture.

Morgan Diefenderfer, Senior, Psychology (Counseling Careers)
Mentor: Patricia Tomich, Ph.D.

Does Deviation from a Balanced Time Perspective Mediate Social Anxiety and Mental Health?

This research assessed associations between social anxiety and mental health with deviation from a balanced time perspective (individuals' perception of the past, present, and future time frames) as a potential mediator. Participants were 306 undergraduates (80.4 % Caucasian; 93.6% female) who completed online surveys. Partial correlations (controlling for age and gender) indicated that more social anxiety was related to worse mental health. In addition, mediation analyses revealed that social anxiety predicted worse mental health by way of the mediator as deviation from a balanced time perspective. Overall, these findings suggest that clinicians could emphasize the importance of balance between individuals' views of the past, present, and future, as this may help decrease social anxiety and improve mental health.

Sophia Finizia, Senior, Psychology
Mentor: Julie Evey, Ph.D.

Relationships Among Caffeine Consumption, Sleep Quality, Grades, and Stress in Undergraduates

Research supports a number of different issues that impact our performance in college. It is hypothesized that the current study will replicate findings presented last year: a negative relationship between caffeine consumption and GPA and a positive relationship between GPA and sleep quality. The current study adds measures of stress and time of caffeine consumption. It is expected that consuming caffeine later in the day will negatively affect sleep; and that students who are experiencing higher levels of perceived stress will tend to have lower GPAs. Data collection is complete; and the findings and implications of the current study will be presented.

Michelah Gipson, Senior, Psychology (Counceling Centers)
Kennedi Stewart, Other, Psychology
Mentor: Angela Neal-Barnett, Ph.D. & Arden Ruttan, Ph.D.

Taking the Stress-Out of Expecting Black Mothers

Pregnant Black women are twice as likely as White women to experience negative short- or long-term health consequences from labor and delivery. Black women are three times more likely to die from a pregnancy-related cause; and preeclampsia is 60% more common in Black women. Our feasibility study is to help expecting mothers have a healthy pregnancy by introducing cognitive restructuring and music. We use an app-based blood pressure wearable that provides expecting Black women with their blood pressure. The likelihood of the expecting mothers wearing the app-based wearable will help us determine if they will use it to measure their blood pressure. Our study is currently ongoing and data is still being collected.

Madalyne Ludovici, Junior, Psychology
Mentor: Amoaba Gooden, Ph.D. & NJ Akbar, Ph.D.

Black United Students

Research Limitations- The analysis of the content available was mainly based on old newspaper articles from the time periods in which they were published. Hence, there may be some information not yet made available or found. There is still plenty of information to recover; and as such, it takes quite a bit of time to find, categorize, and edit the timeline for pertinent information. Practical Implications- This research highlights BUS' contribution and shows that BUS continues to contribute to the current campus culture of KSU and its surrounding cities, the state of Ohio, and National agendas, and is still a relevant organization to this day. Moreover, the continuance of this research will provide more representation for BUS acknowledgements from the aforementioned entities. This research will also provide KSU with a legacy of preserved representations for black students and students of color.

Tisha Owusua, Senior, Psychology
Charles Fitzsimmons, Other, Psychology
Mentor: Clarissa Thompson, Ph.D.

Intersectional Identities and Math Cognition

Exploring math anxiety as it relates to demographic factors is fundamental in examining the underperformance of minoritized students on standardized tests. Previous research has examined math anxiety in the context of the influence of teachers, parents, and the student's self-concept. In our study, we will explore the interrelations between math anxiety as it relates to performance on difficult math content (i.e., fractions) and demographic factors such as gender, race/ethnicity, and education level. This is important given that there is a dearth of research on intersectional identities with respect to math performance and attitudes. The results of our study will provide further insight on how students' perceptions of their ability to excel in math can persist into adulthood.

Kayla Perkins, Senior, Psychology
Mentor: Christopher Was, Ph.D. & Maren Greve, Ph.D. Student

Training in the Medical Field: Efficacy of Online Versus In-Person Modalities

Following the surge of remote practices during the COVID-19 global pandemic, schools and corporations have been hesitant to depart from conducting training and learning online due to ease and cost effectiveness. Despite these perceived advantages, many question the capacity for mastery of material presented online versus in-person. Especially in hands-on occupations like in the medical field, will future doctors and nurses be at a disadvantage? Several studies have been conducted to explore this question and have found conflicting results. The current investigation involves an in depth review of literature accumulated from databases such as Google Scholar and Psych APA. This review of the empirical literature attempts to determine overall current trends in the medical field, hopefully guiding future research and training in the right direction.

Morgan Shingledecker, Senior, Psychology
Mentor: Karigan Capps, Ph.D. Student & John Updegraff, Ph.D.

Health Messages from a Medical Authority and their Impact on Preference Between Prevention and Detection Dental Hygiene Behaviors

The purpose of this study was to test whether information from a medical professional like the American Dental Association is more influential when promoting a detection mouthwash over prevention mouthwash. Findings suggest that acquiring knowledge from the American Dental Association may enhance messages promoting a detection mouthwash rather than a prevention mouthwash, but this effect may not translate to outcomes associated with the behavior itself, such as a preference of one over the other.

Jaspreti Singh, Senior, Psychology (Counseling Careers)
Sara Paredes Raquel, Other, Psychology
Jordan Weith, Other, Psychology
Mentor: Josefina Grau, Ph.D.

The Effect of Maternal Teaching Styles on Toddler Externalizing Behavior in Young Puerto Rican Families

Adolescent Latina mothers face challenges (e.g., poverty, lower levels of education) that can affect their parenting and result in less optimal child development. Research has rarely been conducted with young Latinx families; therefore, this study examines how directive and guiding teaching styles used by 123 Puerto Rican mothers relate to their 24-month-old toddlers' externalizing behaviors, within a cultural context. Mothers self-reported on their cultural values, whereas teaching styles were behaviorally coded from videotaped interactions. Results indicated that acculturation level was associated with higher use of inquiries, whereas enculturation was related to fewer inquiries and more directives. The higher use of inquiries was related to lower levels of child aggression. Findings emphasize the importance of considering familial cultural values when developing interventions for this at-risk population.

Emily Turkily, Senior, Psychology (Counseling Careers)
Mentor: Arne Weigold, Ph.D. & Ingrid Weigold, Ph.D.

Testing Predictors of Personal Growth Initiative: Self-Efficacy and Locus of Control

Personal growth initiative (PGI) is a person's active, intentional desire to grow in life domains. PGI consists of four factors: Readiness for Change, Planfulness, Using Resources, and Intentional Behavior. PGI theory indicates it is partially rooted in self-efficacy and internal locus of control. We examined if self-efficacy and locus of control directionally predict PGI. The sample consisted of 418 college students from a large, urban university. Participants completed the Personal Growth Initiative Scale-II, the General Self-Efficacy Scale, and the Multidimensional Locus of Control Scale. We used path analysis to examine two models with the hypothesized model, which consisted of SE and LoC as predictors of the four aspects of PGI providing the better fit. These findings indicate SE and LoC are better predictors of PGI than the reverse.

Kaitlyn Warakomski, Senior, Psychology (Counseling Careers)
Sarah Colditz, Senior, Psychology
Brena Woodard, Senior, Psychology
Mentor: Christopher Was, Ph.D.

Assessing the Ongoing Effects of COVID-19: Examining Changes to Student Motivation and Volition

The types of academic goals students set greatly determine the self-regulation of study habits. This study aims to observe motivation during in-person learning after virtual learning due to COVID-19. The main objective is to examine whether self-regulation was altered after two years of virtual learning. To get this information, the students will provide insight on studying habits, help-seeking behaviors, testing habits, test anxiety, and self-regulation behaviors. Demographics that pertain to this study are class ranking, GPA, gender, age, and the format of the classes taken to see the outcomes of virtual learning. An open-response question was included to see how the return to in-person learning has changed students' educational experience.

Kaitlyn Warakomski, Senior, Psychology (Counseling Careers)
Mentor: Jennifer Taber, Ph.D.

Assessing Women's Math Performance: Examining the Role of Spontaneous Self-Affirmation

Spontaneous self-affirmation refers to when people focus on their strengths and values when they feel threatened/anxious. The main objective was to examine whether spontaneous self-affirmation helps women who feel threatened by the math and gender stereotype threat. To get this information, a survey was deployed to examine how women perform on math tasks when their gender is salient (and thus they experience stereotype threat). Participants (n=207 women) were randomly assigned to read either a message emphasizing the importance of math (threatening condition) or reading (control condition) in everyday life. Spontaneous self-affirmation was assessed after the demographic section, then math problems were completed. The results indicated that spontaneous self-affirmation does not work for this particular combination of threats (math and gender stereotype).

Brena Woodard, Senior, Psychology
Mentor: Christopher Was, Ph.D.

Research Interest and Education of Art Therapy Professionals

The purpose of this study is to gain an understanding of professionals in the field of art therapy and their knowledge, skill, and interest in art therapy research. In reviewing the extant literature in art therapy, I found that many of the investigators involved were either professionals outside of the field of art therapy or art therapy professionals who were focused on case studies with their existing client(s) as participants. In order to understand this phenomenon, I contacted many professional art therapy organizations and practices, both domestically and internationally, to ask for participation in a survey that was comprised of demographics questions and opinion-based open-ended questions. Following the closure of the survey, 10% of the respondents were contacted at random and asked to participate in a follow-up informational interview, one-on-one. I will code the open-ended information collected from the surveys and interviews with the help of two other researchers.

Brena Woodard, Senior, Psychology

The Effectiveness of Art Theraphy for Sexually Abused Children

To use the existing literature to prove the efficacy of art therapy on children who have been sexually assaulted or abused. Discussing the long and short-term consequences of sexual assault on children and their mediated effects through the use of art. Through examples of children immediately after the assault to adults who were assaulted as children, art therapy is shown to be a proven and effective method of treating traumatized individuals.

Lauren Wyatt, Senior, Psychology
Mentor: Clarissa Thompson, Ph.D.

How Presentation of Fraction Instruction in Picture Books Affects How Parents Understand and Interact with their Children Regarding Fractions

Children and adults dislike fractions and find them difficult, so using fun fraction picture books can promote fraction learning. Many fraction books contain a page of back matter, or instructions, that demonstrates how to solve fraction problems. However, most existing back matter displays fractions using a circle model, despite research establishing that number lines are more effective for teaching fractions. This project will survey caregivers to determine which forms of back matter most positively influence caregivers' fraction learning, operationalized as their ability to solve fraction equivalence and arithmetic problems, as well as their subjective beliefs. We will conduct between-within ANOVAs: 2 (existing back matter or research generated back matter) x 2 (circle visual model or number line visual model) x 2 (within: pre-test and post-test).

Social Science/Education/Public Health

Oral Presentations

Ruby Greenwood, Senior, Nutrition
Mentor: Na'Tasha Evans, Ph.D.

Assesing the needs of Congolese Refugee Women

Refugees are people who have been forced out of their home countries to get away from war, persecution, or natural disasters. In 2016, many Congolese refugees came to America to escape war in their home country. Many of these refugees are women who come with their children. Transitioning to life in America for refugees especially women is not easy. Many of them experience language difficulties, acculturation, assimilation, poverty, depression, etc. This study explored the needs of Congolese refugee women after transitioning to life in America. 20 interviews in person interviews were conducted on refugee Congolese women 18 years or older. All of the participants received assistance from a local resettlement agency during the time of study. A thematic analysis was applied for data collection and for data analysis. Major themes within the answers were transportation, education money assistance, assistance with getting family to America, and healthcare.

Tayjua Hines, Senior, Pan-African Studies (Community Activism, Strategy and Development)
Mentor: Kizzy Albritton, Ph.D.

Social Justice for Black Children Within Early Childhood Education

Most early childhood education programs were originally designed to help close the school readiness gap between children from more affluent backgrounds and those from low-income and economically marginalized backgrounds. Early childhood education is a program that serves young children between 3-5 years old. Targeting children's most critical learning years may assist in advancing later academic and social-emotional skills. Eleven percent of Black students are suspended 3 times more than their White counterparts yet they make up less of preschool enrollment; and Black girls are suspended at higher rates than any of their other racial counterparts. Data states that students who are in the juvenile justice system more than likely have been suspended or expelled; and students who experience out-of-school suspension and expulsion are up to 10 times more likely to drop out of high school than their counterparts.

Kiara James, Senior, Public Health (Community Health Outreach and Development)
Mentor: Kristina Knight, Ph.D. & Kelly Cichy, Ph.D.

Assessing the Youth Development Workforce: Realities, Readiness, and Re-Engagement Post-2020

Youth Development Professionals (YDP) are: (1) individuals who work for organizations that support after school (AS) and other out-of-school time (OST) programs, (2) important and trusted adults in the lives of young people, and (3) engage with youth from all walks of life. The emergence of COVID-19 in the year 2020 and increased efforts to promote racial equity have significantly shifted the structure, focus, and processes associated with YDP and AS/OST programs. Accordingly, the purpose of this study is: to explore the experiences, perceptions of competence, and readiness of YDP in Cuyahoga County; and, to identify strategies to support re-engagement with youth as a part of AS/OST programming. The survey will be administered in 2022 using the Dillman method of web-based research.

Jaela Perkins, Senior, Communication Studies (General)
Mentor: Maureen Blankemeyer, Ph.D.

Maintaining Relationships through Social Media during the COVID-19 Pandemic

The purpose of this study is to highlight the use of social media among college students in maintaining friendships and romantic relationships throughout the pandemic. This will be measured using an adaptation of a Pfeifer's (2020) online survey. It is expected that the results will show students report increased social media contacts or usage with friends versus pre-pandemic. However, the level of social connectedness will differ from pre- to post-assessment due to fewer in-person interactions, and limited social activities. This has implications for future research on in-person interactions in friendships and romantic relationships of college students. Also, future research should look at mental health as related to sustaining friendships and romantic relationships pre-pandemic versus post-pandemic.

Robyn Robinson, Senior, Early Childhood Education
Mentor: Elizabeth Kenyon, Ph.D.

Examining the Affects that Racism has on Pre-Service Teachers

One of the big challenges in education is the under-representation of teachers of color in the teaching profession. However, the literature shows that student teachers of color (or BIPOC students) face a lot of challenges in completing teacher education programs. This research looks at the challenges that pre-service teachers of color in Kent State's Early Childhood Teacher education program face. Using interviews from four students of color, I identify challenges from other students, the program, and faculty in completing their program. It shows that racism is present throughout these spaces, making it especially challenging for BIPOC students to complete the program.

Social Science/Education/Public Health

Posters

Eleora Adams, Senior, Criminology and Justice Studies (General)
Mentor: Starr Solomon, Ph.D.

Police K-9s and Perceptions of Police

In 2020, widespread protests concerning the legitimacy of police officers emerged across the United States in response to several high-profile police deadly force incidents. While a variety of factors influence perceptions of police legitimacy (e.g., race, gender, political affiliation, prior victimization), less is known about how the presence of police K-9s may affect perceived police legitimacy. To better understand how the presence of police K-9s might influence perceived police legitimacy, we administered a survey experiment to a sample of Kent State University undergraduate students. We randomly assigned students to view one of three images of police officers and their K-9s to assess whether the presence of a K-9 influences perceived fear, safety, trust in police, and willingness to cooperate with police.

"Investing in science education and curiosity-driven research is investing in the future" – Ahmed Zewail

Grace Arendt, Junior, Aviation Management
Justin Beatty, Freshman, Computer Engineering Technology
Emma Bushong, Freshman, Human Development & Family Studies
Mackinley Coe, Sophomore, Fashion Merchandising
Piper Dozier, Freshman, Criminology & Justice Studies
Margaret Remley, Freshman, Integrated Health Studies
Emma Sandy, Freshman, Psychology
Aiden Stought, Freshman, Aeronautical Systems Engineering Technology
Molly Acquard, Freshman, Fashion Design
Mentor: David Brondfield

Adulting: A Work in Progress

Our group concluded an important part of college is learning how to be an adult, and it can be hard to learn without guidance. This resulted in the project focus being a seminar or free class designed to help students learn valuable life skills for adulthood. We feel the things you would find useful after college aren't easily accessible. We did take into account that there is an Adulting 101 course offered. Our goal is to create seminars or sessions that are offered at the convenience of the students. The students would be able to sign up for sessions they feel useful to them. Our hope is if the sessions are free and convenient, more students will utilize the help and guidance needed for adulthood.

Purva Chauhan, Junior, Physical Science
Reema Bteibet, Freshman, Psychology
Peyton Cariaco, Freshman, Sport Administration
Mahima Chanana, Sophomore, Visual Communication Design
Jon Evanick, Freshman, Public Health
Kennedy Gotham, Sophomore, Journalism
Zoe McConaha, Sophomore, Theatre Studies
Claire Sierota, Freshman, ASL & English Interpreting
Paige Toth, Freshman, Speech Pathology & Audiology
Mentor: Celeste Dawson, Graduate Student & Johanna Voznak, Graduate Student

Hopeful for a Home

This project, presented by the Provost's Leadership Academy, tackles the issues of homelessness and housing insecurities amongst young adults. Utilizing other project blueprints as well as our own university's resources we aim to establish housing support for those who are in emergency situations that prohibit them from excelling academically. We believe that necessities, such as food and shelter, must be fulfilled before a student can succeed. As a foundation for our project, we are interviewing faculty at the university to gain better insight on how to use the resources already available. From the addition of our program, the university would benefit as well by increasing retention and graduation rates among students at Kent State.

Nicholas Ditz, Sophomore, Digital Media Production
Vincent Scicchitano, Freshman, Computer Science
Amber Lewandowski, Freshman, Nursing
Evan Coates, Freshman, Public Health
ReAnn Santilla, Freshman, Environmental Studies
Sophia Michalak, Freshman, Business Management
Lennice Bolton, Sophomore, Computer Science
Mentor: Celeste Dawson, Graduate Student & Johanna Voznak, Graduate Student

Project Hygiene

Project Hygiene, our Provost Leadership Academy project, hopes to tackle the issue of low accessibility of health products on and around campus. In our research, we have found that many students have had trouble obtaining hygiene products for themselves, which all people need in order to be successful in their lives. We hope to form a system with the residence halls to supply and support students with their health-related needs, as well as create a code of honor to not short out the supply to those who need it the most. In doing so, we hope to keep our community safe, increase awareness of the health-related issues across campus, and embody the motto of "Flashes take care of Flashes."

Lisa Everson, Senior, Sociology (Sociological Social Psychology)
Mentor: Jessica Leveto, Ph.D.

The ADHD Gender Gap: An Autoethnographic Study of ADHD Underdiagnosis in Girls

Female children and adolescents are less likely to be referred and treated for ADHD and, without treatment, face significant impairments throughout the life span. Current literature suggests that diagnostic bias and gender differences in symptom expression in children play significant roles in the diagnosis gap. In this study, I use content analysis of personal journals, poetry, and autoethnographic reflective inquiry to identify patterns and social factors contributing to the gender gap in diagnosis. Using a feminist perspective, I critically examine and reflect on my experiences of missed ADHD diagnosis and embed this narrative into the broader diagnostic patterns. I expect to find complexity and variation often overlooked and unexamined in quantitative and clinical research.

Chazzlyn Jackson, Senior, Pan-African Studies (Community Activism, Strategy and Development)
Fionna Fisher, Senior, Sociology (General)
Mentor: Carla Goar, Ph.D. & Bobbi Reidinger, Ph.D.

How Predominantly White Social Movement Organizations Use Social Media

The historic year of 2020 has led to an altered racial climate and an increase in social movement participation in both offline and online spaces in the United States. Social movement organizations (SMOs) have utilized online platforms to increase awareness of social problems. For this project, predominately White SMOs, Free Ohio Now and Showing Up for Racial Justice, will be further examined via the platform Facebook. A content analysis of each groups' Facebook page will be conducted examining data from January 30th, 2020 to January 30, 2021 for engagement strategies and responses of race and other current issues during that time. A coding scheme will be created to reflect important themes and central patterns for the ultimate findings.

Charlotte Lee, Junior, Criminology and Justice Studies (Criminology and Deviance)
Mentor: Susan Fisk, Ph.D.

Retaining Black Women in Computing

Black women remain severely underrepresented in computing despite efforts to diversify the field, with literature suggesting that tailored approaches are necessary to address the barriers Black women face. However, it is difficult to quantify which interventions are the most impactful for Black women, as samples typically contain too few Black women for robust statistical analysis. Using data from a Broadening Participation in Computing alliance (BPC), we use regression analyses to quantitatively examine which BPC interventions are most important for increasing Black women's intentions to persist in computing, with comparison to other student demographic groups (specifically, Black men, White women, and White men). We find that career awareness and faculty mentorship are the two interventions which have a significant, positive impact on Black women's computing persistence.

Eva Malasi, Sophomore, Psychology (Counseling Careers)
Gillian Canacci, Sophomore, Studio Art
Natasha Hartmann, Freshman, Biology
Endiah Johnson, Freshman, Interior Design
Madalyne Sinley, Freshman, Criminology & Justice Studies
Kylie Sprankle, Sophomore, Nursing
Amelia Van Arsdale, Sophomore, Education
Sprout Dickerson, Freshman, Visual Communication Design
Brandon Keshock, Freshman, Exploratory
Mentor: Celeste Dawson, Graduate Student & Johanna Voznak, Graduate Student

Accessibility on Campus

Accommodations in the classroom are an important part of our learning experience and can be beneficial to all students. Our Provost Leadership Academy professional team project is a multi-faceted plan including two parts: an accessibility accommodation sector as well as a portion dedicated to financial accommodation to help aid students in their learning experience regardless of diagnosis. For example, giving faculty the resources they need to better accommodate the students which would include microphones, audio recordings and/or transcripts of classes, PowerPoint presentations and lecture notes, digital textbooks with text to speech options available, automatic captioning, and extra financial responsibility. Students want to see that their university cares about their needs, implementing accommodations across the board will help prove this. We believe that increasing accommodations will help students succeed, further emphasizing that flashes take care of flashes.

Katerina Wright, Senior, Criminology & Justice Studies
Mentor: Kristenne Robison, Ph.D.

Creekview Probationers

My research is about probationers' experience in the criminal justice system. I feel that we should all be interested in probationers because 4.5 million people are on probation in the United States. That is two times more than those in prison and jail combined. Most research has been focused on prison and jails rather than on probation. The research question I was seeking to answer was, "what is the likelihood of recidivism for probationers?" However, the research conducted caused me to theorize that different social classes experienced the criminal justice system differently. I wanted to dive deeper into this theory; and that is what my research presentation covers. Does social class determine the treatment, outcome, and length of time a person is on probation?

Social Science/Education/Public Health

Remote

Patricia Gaines, Senior, Sociology (Sociological Social Psychology)
Mentor: Jessica Leveto, Ph.D.

Frequent Photo Manipulation on Social Media and Teenagers' Self-Esteem: Examining the Relationship Between Selfie Filters and Self Image

The American Psychiatric Association (APA) defines 'selfies' as the obsessive-compulsive desire to take photos of one's self and post them on social media as a way to make up for the lack of self-esteem and to fill an intimacy gap. Social media negatively impacts various aspects of oneself. This proposed project centers on the following research question: How does frequent photo manipulation of selfies on social media alter teenagers' self-esteem? Does frequent photo manipulation of selfies on social media impact the self-esteem of young men and women differently? This proposed mixed-method study will utilize focus groups and follow-up surveys to explore the relationship between self-image and frequent photo manipulation on social media.

Nick Gregg, Senior, Sociology (Sociological Social Psychology)
Mentor: Jessica Leveto, Ph.D.

Technology Literacy's Impact on Online Learning Outcomes, Engagement and Attitudes Toward Online Learning

Technological literacy and access are essential, often overlooked factors in online learning. This proposed study focuses on how technological literacy and access are related to online learning. The central research questions are, how do technological literacy and skills impact online class performance, and what impact do these skills have? This proposed study will utilize the Computer Literacy and Internet Knowledge (CLIK) assessment of technology skills (via a survey), in-depth interviews, and follow-up tests. This work is important because online learning options have grown and will continue. Addressing technological literacy and access disparity will make online learning a practical choice for educators. This proposed study would inform the practice of online education.

Michelle Lambert, Senior, Sociology (Medical Sociology)
Mentor: Jessica Leveto, Ph.D.

How does Socioeconomic Status Affect Health Outcomes?

People of low socioeconomic status (SES) have worse health outcomes than those with higher SES. This proposed study intends to identify and explore factors contributing to this pattern. This project centers on the following research questions: 1) What processes exacerbate poor health outcomes between generations among those living in poverty? 2) How do individual-level behaviors of family members intersect with structural conditions to contribute to these processes? This project will use a mixed-method approach, exploring the lived experiences of those living in poverty and using a self-administered survey. This project is important because it explores how socioeconomic status impacts physical and mental well-being and creates awareness of the social determinants of health.

Brook Lyn Mercado, Junior, Public Health (Pre-Medicine, Dentistry, Osteopathy)
Mentor: Robin Shura, Ph.D.

COVID-19 in the US territories: A Comparative Analysis of Health Disparities

The objective of this research is to compare and contrast COVID-19 related outcomes in the US territories with the US while examining these effects with respect to the social and cultural conditions. In the past, particularly during the 2009 influenza pandemic, the US territories faced many barriers such as lack of PPE, staffing, equipment, supplies, and funding. These patterns are currently being seen during the current COVID-19 pandemic. During this study, descriptive analyses of pre-existing data from WHO will be used to examine vaccination rates, mortality rates, and the number of cases. Data analyses will identify if the outcomes of the COVID-19 pandemic are explicitly affected by the conditions of the US territories.

"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