



CELEBRATION

**OF STUDENT RESEARCH
AND CREATIVITY**

SPRING 2023

REAL AMBITION
REAL SUCCESS

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LETTER FROM THE INTERIM PRESIDENT



To Our Celebration 2022 Participants and Guests:

Welcome to Northern Kentucky University's annual Celebration of Student Research and Creativity. I want to congratulate the students and faculty mentors who are participating this year, as well as extend gratitude to the guests and visitors joining us today.

This is our 21st year celebrating outstanding undergraduate and graduate research and creativity at NKU. We are so proud of our scholars and our creatives, and it is a joy to showcase their incredible work.

These projects and creative pieces enable our students to apply classroom instruction while sharing their knowledge and passion with the campus and community. This kind of active learning is important, and it's central to how the university develops innovative student-centered strategies that align with the needs of the region.

As we celebrate student work this week, we also highlight the faculty mentors central to these projects. Our dedicated instructors here at NKU work alongside students on these projects—from fostering creative and intellectual skills all the way through helping students strengthen their presentation capabilities. The bonds our faculty work to build with students are evidence of this university's core values of excellence, integrity, inclusiveness, innovation and collegiality.

The work on display this week exemplifies what the people of NKU do for this region, as students learn skills and talent for successful careers and impactful lives. Our students are truly special, and they transform their communities and the world at large.

Again, congratulations to all whose work is showcased in this year's Celebration. We are grateful to all who have made this week so memorable.

Sincerely yours,

A handwritten signature in black ink that reads "Bonita J. Brown".

Bonita Brown
Interim President

LETTER FROM THE PROVOST



Dear Celebration Participants,

It is my great pleasure to welcome you to the Northern Kentucky University 2023 Celebration of Student Research and Creativity!

This year's event continues the remarkable tradition of outstanding scholarly and creative work produced by NKU students under the guidance and mentoring of the faculty. The Celebration of Student Research and Creativity is a wonderful opportunity for our students to display their work through poster presentations, oral presentations, interactive demonstrations, virtual presentations, performances, and exhibits of artistic work across the campus community.

The Celebration of Student Research and Creativity provides evidence of the close connection between students and faculty that has become a hallmark of the NKU educational experience.

These opportunities enhance student learning via intense engagement and discovery in a chosen academic field. The work is challenging. Research takes time and effort, but the rewards of this form of experiential learning can be tremendous.

On behalf of Interim President Bonita Brown, the deans of our colleges, the chairs and directors of our academic departments and schools, and the entire NKU community, I congratulate you all on the research and creativity showcased during this annual celebration.

Sincerely,

A handwritten signature in black ink that reads "Matt Cecil". The signature is fluid and cursive, with the first name "Matt" and last name "Cecil" clearly distinguishable.

Matt Cecil
Provost and Executive Vice President for Academic Affairs

SCHEDULE

WEDNESDAY, APRIL 19, 2023

9 – 10 a.m.

Oral Presentations

SU 108

10 – 11 a.m.

Oral Presentations

SU 108

11 a.m. – 12 p.m.

Oral Presentations

SU 108

12 – 1p.m.

Oral Presentations

SU 108

12:30 – 3 p.m.

Poster Presentations

Student Union Ballroom

1 – 2:15 p.m.

Oral Presentations

SU 108

2:15 – 3 p.m.

Oral and Creative Presentations

SU 108

3 p.m.

**Nýsa, The NKU Journal of Student Research
Volume 5 launch**

SU 109

CREATIVE PERFORMANCES FROM SCHOOL OF THE ARTS

April 14–23

A Grand Night for Singing

See nku.edu/sota for tickets

Monday, April 17 // 7 p.m.

Steelband

Greaves Concert Hall

Monday, April 17 // 7 p.m.

Burdette Voice Studio Recital

FA 378

Tuesday, April 18 // 7 p.m.

Vocal Jazz & Jazz Ensemble

Greaves Concert Hall

Thursday, April 20 // 7 p.m.

Concert Band & Symphonic Winds

Greaves Concert Hall

Friday, April 21 // 5 p.m.

Woodwinf Area Recital

Greaves Concert Hall

ORAL PRESENTATIONS APRIL 19, 9 – 10 A.M.

Observations of the Changing-Look AGN RX J0128.1-1848

Alaina Spencer

Physics

Physics, Geology and Engineering Technology

Arts and Sciences

Faculty Sponsor: Dirk Grupe

Abstract: While in the standard Unified Model of Active Galactic Nuclei we distinguish between Seyfert 1 and 2 galaxies, some AGN change their type. These are called Changing Look AGN, and many of them have been known for more than a decade. In November 2022, another of this rare type was discovered by Swift in an unusually low X-ray flux state: the galaxy RX J0128.1-1848. This discovery triggered XMM and NuSTAR observations at the beginning of January 2023. Here, I will summarize the preliminary results from our Swift monitoring of RX J0128.1-1848 and well as from the XMM and NuSTAR observations.

Nope! It did not do it again. The Story of IC 3599

Salem Wolsing

Physics

Physics, Geology and Engineering Technology

Arts and Sciences

Faculty Sponsor: Dirk Grupe

Abstract: I will report on the long-term monitoring campaign of the Seyfert 1.9 galaxy IC 3599 by Swift, starting in 2013. IC 3599 was discovered as an extremely bright X-ray source during the ROSAT All-Sky Survey in 1991, but later pointed observations revealed a dramatic drop in the X-ray flux. One model to explain such a dramatic X-ray outburst is the tidal disruption of a star by the central black hole. However, another flare was detected in 2010 by Swift. This makes the Tidal Disruption Event (TDE) scenario less likely and favors an accretion disk instability. Nevertheless, one possibility is the partial tidal stripping of a star on an elliptical orbit around the star which would suggest a periodic flaring. In this model it was predicted that another flare would occur in 2019/2020. Our Swift monitoring clearly shows that this is not the case and that the flares can be explained by accretion disk instabilities. I will present how that X-ray and UV emission in IC 3599 has changed over the last decade and what this means for modelling this AGN.

ORAL PRESENTATIONS APRIL 19, 10 A.M. – 11 A.M.

Development of Solar Panel Emulator

Alejandro Villasenor

Electrical and Electronics Engineering Technology

Physics, Geology and Engineering Technology

Arts and Sciences

Faculty Sponsor: Zeel Maheshwari

Abstract: Electricity generation using conventional sources such as fossil fuels produce greenhouse gases that are harmful for the environment and society as well as the cost to recover these resources take a lot of time and effort to gather them. Renewable resources are a viable option to reduce the emission of harmful gases by fossil fuels. One of the most prominent renewable energies is solar energy. The goal of this study is building a solar Photo Voltaic (PV) emulator for laboratory purposes. Effect of solar radiation and the effect of temperature changes are studied by varying the resistor and source voltage.

The Birth and Preservation of a Culture: The German American Experience in the Greater Cincinnati Area

Elizabeth George

Political Science

Political Science, Criminal Justice and Organizational Leadership

Arts and Sciences

Honors

Faculty Sponsor: Andrea Fieler

Abstract: The Greater Cincinnati Area has a rich history thanks partly to its German immigrants. Previously, many studies had explored this part of Cincinnati's culture, however, interest and research into Cincinnati specifically have waned over time. The 1990s specifically experienced the steepest drop-off with little recovery. I gathered information on this long history by analyzing nearly one hundred years worth of secondary and primary information on the community. This research paints a comprehensive picture of the Greater Cincinnati Area's German American culture to encompass both past and present reflections of the area's heritage from past to present.

How Public Policy Affects the Management of Invasive Pets in the United States

Kara Wright

Political Science

Political Science, Criminal Justice and Organizational Leadership

Arts and Sciences

Honors

Faculty Sponsor: Michael Baranowski

Abstract: Invasive species are extremely detrimental to the environment, and many are introduced through their status as current or former pets. This study will explore how policy can affect the management of pets that have become invasive species in the United States. Thorough research was conducted on the effectiveness of different policy solutions and potential obstacles for management. Experts have suggested policy solutions to this problem, but these face several barriers to being passed. Existing policies have had varying levels of effectiveness. These results indicate that policy can successfully address problems associated with invasive pets if it can navigate potential impediments.

ORAL PRESENTATIONS

APRIL 19, 11 A.M. – 12 P.M.

Social Health Needs Assessment and Community Resource Program at a Medically Underserved Clinical Site

Jennifer Hunter

Nursing

School of Nursing

Health and Human Services

Faculty Sponsor: Teresa Huber and Anne Sahingoz

Abstract: Social determinants of health have a significant impact on the health of individuals and communities. Examples of social conditions are economic stability, access to housing, education and healthcare, food security, and built-in environments. Lack of these conditions can contribute to poor health. A quality improvement project was conducted at a health clinic for the underserved in Covington, Kentucky. The project aimed to identify social needs, increase awareness of community resources through referral, and link individuals to resources with nurse navigation. The program participation rate was high (90%) with the majority (97%) of clients agreeing to nurse navigation services over a 12-week period. These services connected clients 64.7% of the time to needed social resources, which was above the 40% benchmark. The project was successfully integrated into clinical service delivery with positive participant feedback.

Eating Disorder Incidence and Nutritional Health in Female College-aged Students and the Role of the Media During the Pandemic

Alex Ludwig

Electronic Media & Broadcasting/Journalism

School of Communication and Media

Informatics

Honors

Faculty Sponsor: Megan Sanctuary

Abstract: The COVID-19 pandemic has impacted the life of many young college students. Many countries implemented lockdown requirements to slow down the spread of COVID-19. The lockdown requirements significantly impacted daily routines and induced stress and anxiety for many female college students, ages 18-24, who were already at an increased risk for developing an eating disorder, saw their eating habits change. This paper will delve into the impact of COVID-19 lockdowns on the nutritional health and wellbeing of this population.

Thời Trang of the Self

Vanessa Khong
Integrative Studies
Honors

Faculty Sponsor: Ronnie Chamberlain

Abstract: How is fashion design and self-expression through fashion influenced by one's culture, thoughts, and emotions? From researching through scholarly sources on fashion concepts while pulling from my own culture as a Vietnamese-American, I created a collection of fashion designs. Additionally, my findings conclude that increasingly so, clothing is an essential way in which individuals choose to communicate their unique identities and perspectives to the world. The impact of this study lies within my audience gaining a better understanding of the choices we make, with the influence of our emotions and cultural backgrounds, on what we wear and creatively design.

ORAL PRESENTATIONS

APRIL 19, 12 – 1 P.M.

The Globalized Impact of the War in Ukraine

Grant Toler
International Studies
Political Science, Criminal Justice and Organizational Leadership
Arts and Sciences
Honors

Faculty Sponsor: Kimberly Weir

Abstract: The world is more interconnected now than ever before, meaning that all countries and people are linked together. When Russia invaded Ukraine, shockwaves could be felt throughout the world. Seeking an understanding of how an invasion by one country upon another has impacted the whole globe, this project looks at the history of Russian aggression, the economic fallout from the current invasion, and the international response to Russia's actions. This project shows the globalized impact of the war in Ukraine, how the effects are being felt around the world, and who is feeling the effects the most.

International vs. Domestic Accounting Standards in Japan: Key Differences and Why They Matter

Grant Elswick
Accounting
Accounting, Economics and Finance
Business
Honors

Faculty Sponsor: Erin Masters

Abstract: The complexities of accounting standards internationally can lead to confusion for both stakeholders and accountants. This is evident in the differences between Japanese Generally Accepted Accounting Principles (J GAAP) and International Financial Reporting Standards (IFRS), two of the four accounting standards that Japanese companies can use for consolidated financial statements. Using both scholarly resources and the standards themselves, this research looks at these accounting standards used in Japan and their differences. While research has been done on the topic, the scope is limited. This project summarizes some existing research and highlights the need for additional comprehensive information around this topic.

Sales Forecasting of Used Car in the USA Using Statistical and Deep Learning Models

Guysnove Lutumba
Data Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Yangyang Tao

Abstract: This study uses used car sales data from January 1992 to December 2022 to forecast the sales for 2023. We use three different methods to forecast sales for 2023: statistical models, deep learning models, and prophet to automate the forecasting process. The analysis of the sales time series data shows the presence of trend and seasonality, which means the SARIMA model is the appropriate model to use in the family of statistical models

ORAL PRESENTATIONS APRIL 19, 1 – 2:15 P.M.

Federally Qualified Health Centers and their impact on income inequality in Kentucky

Rebecca Guy Clawson
Economics
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: This project looks at income inequality across counties in Kentucky. It compares the income inequality between counties with and without Federally Qualified Health Centers (FQHC) to determine if there is a relationship between FQHC and income inequality. The project also looks to see if having a FQHC within the county impacted income inequality after the Covid-19 pandemic.

Innovation and Inequality: The Side Effects of the Creative Economy

Andrew Reynolds
Economics and Marketing
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: Associated with success and growth, innovation carries a positive connotation. In an economy where growth is essential, innovation is crucial. To better understand innovation holistically, this paper studies the negative side effects of the phenomenon. To discover the relationship between innovation and inequality across the US, I utilize panel data consisting of 20 years of data for factors such as the gini coefficient, population with high-speed broadband internet, and percent of non-white citizens. I also utilize dummy variables to compare different regions. I hypothesize that income inequality and innovation are positively correlated, exasperated by technology barriers and racial diversity.

Income Inequality in Africa

Sam Nwosu
Economics
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: Income equality is prevalent in Africa. This project will analyze and elaborate on the correlation between income equality and economics outcomes like education & corruption.

Factors Affecting Marriage Rates in the United States from 1968 to 2021

Angela Reed

Economics

Accounting, Economics and Finance

Business

Faculty Sponsor: Linda Dynan

Abstract: Marriage rates in the United States have declined significantly over the past few decades. Several claims have been made from news outlets and social media activists that try to point the finger at groups of individuals, politics, or government policy. Has this decline been the result of choices we, as a society, have made? Or has it just been a side effect of our advancing society? Understanding the factors that contribute to these trends is important for policymakers and individuals seeking to build long-term relationships, understanding our changing economy, and advocating for the best outcome. This research paper analyzed data from the World Bank, the United States Census Bureau, and other sources to identify trends and potential factors affecting marriage rates. The factors are identified and compared through multiple linear regression analysis and standardized regression. The analysis includes changes in demographics, advancements in technology, and changing cultural and economic conditions.

ORAL AND CREATIVE PERFORMANCES
APRIL 19, 2:15 – 3 P.M.

Wildflower Wine: The Music of Longing in 11 Works of Classic Literature

Mikayla Schutte

English

Arts and Sciences

Faculty Sponsor: Andrea Gazzaniga

Abstract: Are pieces of Romantic and Victorian literature still relevant today? For this project, I attempted to capture the 19th-century stories of writers like Austen, Hardy, and the Brontës within the realm of 21st-century lyricism, exploring the major conflicts and themes of 11 works within 8 individual songs. My goal was to analyze pieces of literature that feel remote and inaccessible to modern readers and prove—through my own creative work—that anyone can connect with them. In the process of adapting these works, I came to the conclusion that their themes—of love, loss, and the human condition—are timeless and universal.

Race Correction in Medicine: Patient Perceptions and Feelings Towards Their Race and Medical Care

Alixandria Harris

Sociology

Sociology, Anthropology and Philosophy

Honors

Faculty Sponsor: Joan Ferrante

Abstract: In healthcare, many diagnoses, prognoses, and treatment plans are determined by instruments and algorithms and while many of them are revolutionary in affecting health outcomes, for nonwhite people in the United States the care they receive with these instruments and algorithms is diminished. This is due to the race correction in medicine, a non-scientific practice, existing since 1787 that negatively impacts health outcomes for nonwhite individuals on the basis of their race. This study investigates the history of race corrections and the extent to which white and nonwhite patients believe race is a factor in the healthcare they receive.

POSTER SESSION
APRIL 17, 12:30 – 3 P.M.

1. Hybrid EEG-based Brain Computer Interface

Zachary Sargent and Aaryans Nepal
 FYRE Students
 Computer Science
 School of Computing and Analytics
 Informatics

Faculty Sponsor: Mahdi Yazdanpour

Abstract: We propose a new framework to develop a Hybrid Brain Computer Interface (H-BCI) by taking advantage of multiple deep learning techniques. We use a wireless electroencephalography (EEG) brainwear to read the human brain neurosignals. Our brain computer interface processes and classifies the EEG signals and then translates them into meaningful commands to control an output device to carry out a desired action. At the core of our framework, we use combination of Convolutional Neural Network (CNN) and Recurrent Neural Network (RNN) for feature extraction and EEG signal classification to enhance the performance and accuracy of our brain computer interface.

2. Detecting Disinformation with ChatGPT

Ryan Nantz
 FYRE Student
 Computer Information Technology
 School of Computing and Analytics
 Informatics

Faculty Sponsor: James Walden

Abstract: The detection of AI disinformation is a topic of vital importance, as AI unchecked could undermine trust in societal institutions. The specific problem we intend to solve is how AI disinformation, such as fake news, can be detected and refuted by deep learning AI, such as ChatGPT. We are evaluating ChatGPT using a dataset of fake news stories and gauging how frequently it detects a story as fake. Present results have put ChatGPT at detecting a majority of false stories as such, which has useful implications going forward with regards to the creation of some form of detection software.

3. A joint quantile estimation of the tourism consumption decision

Abhinam Joshi
 FYRE Student
 Economics
 Accounting, Economics and Finance
 Business

Faculty Sponsor: Sami Al Farhan

Abstract: Maximization of tourism expenditure is imperative to the development of many economies worldwide. Recent research considers modeling the behavior of tourism expenditure to devise ways to maximize spending from inbound tourists. Contributions to methods and measurement are still welcomed, see Brida and Scuderi (2013). This paper models tourism consumption decisions using data on inbound international tourists at an emerging destination; namely the Sultanate of Oman. We employ airport survey data and implement a framework suggested by Aguiló et al. (2017) via quantile regression analysis, where the endogeneity of length of stay, which along with daily spending jointly determine total expenditure at a given destination.

4. Bias Against The Bible? A Study of Faculty Response Rates

Andrea Saavedra Ferreira
 FYRE Student
 Psychological Science
 Psychological Science
 Arts and Sciences

Faculty Sponsor: Douglas Krull

Abstract: This research was designed to explore whether college professors would display prejudice against religious people. We collected a total of 500 faculty emails from the 50 flagship universities and plan to ask these faculty to complete a survey. The email signature will contain two Bible verses, two non-religious quotes, or neither of these (the control condition). We predict that faculty will be less likely to complete the survey in the Bible verses condition. If so, this might indicate a bias toward religious people, which might also appear when faculty choose student research assistants or make decisions about graduate school admissions.

5. Does it add up? Comparing a Local Sample of Recreational and Prescription Drug Use to National Norms

Elizabeth Enneking
FYRE student
Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Ty Brumback

Abstract: Recreational alcohol and drug use in the United States is most prevalent among 18–25-year-olds. While the rates of substance use among this population have not significantly increased over the past 10 years, rates of prescription psychotropic medications have. Our study examines data from 2018 to 2022 in the Developmental Autonomic Psychophysiology lab to compare rates of substance and prescription medication use to national databases. The study includes 345 participants aged 18–25 from in and around the NKU community. We predict that substance use at NKU will be lower than national averages, but that psychotropic medication use may be higher.

6. Using the Acoustic Startle response to assess developmental neurotoxicity in Cyp1b1 (-/-) mice after benzo[a]pyrene exposure

Olivia Kennedy, Rita Ghimire and Shreeukta Adhikari
FYRE Students
Biology and Neuroscience
Biological Sciences
Arts and Sciences

Faculty Sponsor: Christine Perdan Curran

Abstract: Benzo[a]pyrene (BaP) is a widespread pollutant linked to cancer and adverse effects on human brain function. Traffic emissions, smoke, and grilled foods all result in BaP exposure. To understand if genetic differences can affect susceptibility to developmental BaP exposure, we used Cyp1b1(-/-) knockout mice which lack an enzyme known to metabolize BaP. We used Acoustic Startle with pre-pulse inhibition to determine if sensorimotor-gating is normal. A mouse with normal brain function will have a reduced response to a loud noise when first given a warning tone (pre-pulse). Animals that don't respond at all will be further assessed for hearing loss.

7. First Year Explorations in Mathematics and Statistics: Markov Chain Modelling of a Micro Version of the classic board game: Chutes and Ladders

Matthew Miller, Eli Dunn, Colton Gregory and Justin Poettker
Mathematics, Statistics and Physics
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Stephen Newman and David Agard

Abstract: We develop the Markov Process structure for a simplified version of the renowned board game Chutes and Ladders. This project studied the primary variable of interest representing how many “rolls of the dice” are necessary to finish the game for an individual player. Our analysis also examines the “effect” of going first in the multi-player situation, and lastly studied the number of rounds for the winner to emerge in the multi-player game. We use the programming language R to simulate the playing of this game and compare simulation results to the developed probability distribution theory.

8. First Year Explorations in Mathematics and Statistics: Markov Chain Modelling of the Children's Game: Hi Ho! Cherry-O

Ethan Art, Joshua Osakwe, Dylan Keethler and Layne Puett
Mathematics and Secondary Education
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Stephen Newman and David Agard

Abstract: We develop the Markov Process structure for the board game Hi Ho! Cherry O. This project studied the primary variable of interest representing how many “spins” are necessary to finish the game for an individual player. Our analysis also examines the “effect” of going first in the multi-player situation, and also studied the number of rounds for the winner to emerge in the multi-player game. We use the programming language R to simulate the playing of this game and compare simulation results to the developed probability distribution theory.

9. First Year Explorations in Mathematics and Statistics: Markov Chain Modelling of the classic Gambler's Ruin Problem

Elijah Ralya, Andrew Warth, Luke Clay and Ean Gardiner
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Stephen Newman and David Agard

Abstract: We develop the Markov Process structure for the classic Gambler's Ruin Problem. This projects studied the two important features: 1) The eventual probabilities for "Victory" and "Ruin" from the perspective of the gambler, and 2) the variable representing how many "turns" are necessary to finish the game. Additionally, we use the programming language R to simulate the playing of this game, and compare simulation results to the developed probability distribution theory.

10. Self-directed exercise in adult males engaged in inpatient drug and alcohol addiction treatment.

Taylor Allesch and Maura Bennett
Clinical Mental Health Counseling and Exercise Science
School of Kinesiology, Counseling, and Rehabilitative Sciences
Health and Human Services

Faculty Sponsor: Jennifer Kaiser and Dana Ripley

Abstract: Research regarding the use of exercise in drug and alcohol treatment, despite its early promise, is immensely underdeveloped. Specifically, there have been few studies that lay the foundation for the type of exercise that may be preferred in an inpatient drug and alcohol setting. This initial study attempts to remedy this lack of knowledge by qualitatively assessing the exercise and physical activity preferences for males engaging in inpatient drug and alcohol addiction treatment. Clients actively engaged in treatment at the Transitions facility were recruited to participate in brief, semi-structured interviews via Zoom. The semi-structured interview included questions regarding the participants' physical activity history, use of the available exercise opportunities at the treatment center, and preferences for exercise equipment and instruction in the inpatient treatment setting. Qualitative analysis identified themes of Free Weights Provide the Option for Strength Training, Treatment Centers should Prioritize Exercise and Nutrition, Exercise Improves Emotion Regulation and Enhances Perceptions toward Physical Body, Current and/or Past Exercise Participation, Current and/or Past Physical Activity Participation, and Current and/or Past Sport Participation.

11. Assessing individual differences in leader readiness: Development of a scale

Bri Farmer, Keesa Nutter, Will Phillips, Colin Stepien and Kate Wade
Industrial-Organizational Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Philip Moberg

Abstract: In the current study we assessed employee self-perceptions of readiness for leadership roles. Based on existing leadership theory, we developed a scale to measure six aspects of leadership readiness reflecting achievement and introspection themes. To assess construct validity, we examined correlations between our factors and measures of several related constructs. Valuable insight was gained into the way that s, just beginning to enter the workforce, view leadership readiness compared to the theoretical way that researchers view leadership.

12. An Eye-Tracking Solution Using Consumer Grade Webcams for Potential Concussion Diagnosis and Evaluation

Elaina Hall and Brett Thaman
Computer Science and Computer Information Technology
School of Computing and Analytics
Informatics

Faculty Sponsor: Nicholas Caporusso and Gabriel Sanders

Abstract: In the past decade, eye-tracking technology has been increasingly utilized in healthcare settings to assess an individual's cognitive status under various circumstances to evaluate the presence of brain injuries and monitor the evolution of temporary or permanent cognitive illnesses. More specifically, emerging research has confirmed that disconjugate eye movements can be utilized as a predictor of a concussion and potentially return-to-play protocols. Currently, most healthcare applications use eye-tracking devices requiring more detailed signals at a higher sampling rate and with better camera resolution compared to the eye-tracking technology used in the consumer market. Unfortunately, this limits the availability of this type of diagnostic system to clinical settings and prevents its use in situations where early diagnosis is crucial (e.g., during a football game, where 300,000 concussions are reported yearly). In this paper, we introduce a solution for potentially diagnosing and treating concussions based on images acquire with inexpensive and more available camera devices such as webcams, and we detail a performance evaluation study of a popular image segmentation and object detection machine learning model (i.e., MediaPipe Facemesh and Iris) applied to the acquisition and analysis of eye-related signals (e.g., eye movements and blinking) for healthcare applications.

13. Uncovering Spring 2020 Celebration of Student Research and Creativity

Guy-Georges Adou Bogolo
Business Information Systems
School of Computing and Analytics
Informatics

Faculty Sponsor: Susan Brudvig and Deborah Reichler

Abstract: This research project aims to conduct a comprehensive analysis of the bi-annual Celebration of Student Research and Creativity at Northern Kentucky University, specifically the Spring 2020 edition. The project seeks to investigate the participation levels of NKU's colleges, departments, and majors, student engagement, types of work presented, research topics and methods, and work distribution. The results will be used to create a business intelligence tool that can inform decision-making to support student research and creativity. The findings will enhance the understanding of student scholarship and the production of high-quality scholars to better serve the NKU community.

14. Effects of Sex and Inflammation on Context Object Discrimination Memory in Rats

Maddie Buroker, Jenna Dunham and Bree Sweeney
Neuroscience
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lauren Williamson

Abstract: Inflammation can have profound effects on the brain and memory. We assessed the effects of sex and inflammation on rat learning and memory with the context-object discrimination (COD) task. The COD task requires rats to recognize a familiar object in a novel setting after two sessions of exploration. Inflammation affects males and females differently, with increased inflammatory signaling in males that is not present in females. The increased inflammation disrupts male memory formation on the COD task. We tested the rats' memory on the COD task after treatment with either LPS or saline. The estrous cycles of female rats were also assessed prior to training and on testing day. Serum levels of gonadal hormones and inflammatory molecules will be analyzed to evaluate hormonal mechanisms for the sex differences in behavior.

15. The impact of heat extraction from one hand on repeated jump performance in NCAA Division I volleyball players

Danielle Rennekamp
Biology
Biological Sciences
Arts and Sciences
Honors

Faculty Sponsor: Jason White

Abstract: Muscle exhaustion is temperature sensitive. Performance decreases as muscles overheat. Heat extraction technology slows temperature increase, improving performance. This poster's purpose is to investigate hand cooling on repeated jump performance in female NCAA Division I volleyball players. In this study, volleyball players will perform two identical, randomized sessions: five Bosco anaerobic tests, with cooling occurring for three minutes between tests in the cooling treatment and no cooling between tests in the non-cooling treatment. Heart rate, lactate, and force plate data will be collected. e-Celsius core temperature monitoring will track core temperature. Statistical analysis of data will be conducted via ANOVA.

16. Heuristic Search Algorithm in Games

David Moody
Data Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Yangyang Tao

Abstract: Heuristic search is a core area of Artificial Intelligence (AI) research and its algorithms have been widely used in planning, game-playing, and agent control. In this project, we are interested in real-time heuristic search algorithms that can resolve an 8 puzzle game. We want to first implement the heuristic search algorithm in the game. Then test the performance of the algorithm and then analyze the results.

17. Face Recognition With Unlabeled Data

Thu Le

*Data Science**School of Computing and Analytics**Informatics*

Faculty Sponsor: Yangyang Tao

Abstract: Dataset in face recognition usually contains limited degree and types of variation, so trained models generalize poorly to more realistic unconstrained face datasets. Labeled face data with larger variations could be helpful, but it is practically infeasible due to privacy and labor cost. In comparison, it is easier to acquire a large number of unlabeled faces from different domains, which could be used to regularize the learning of face representations. In this project, we investigate a method that uses unlabeled data to improve the accuracy of face recognition.

18. Benefits of Predictive Modeling with Logistic Regression in Medical Decision-Making

Hanna Schmitt

*Mathematics and Statistics**Arts and Sciences*

Faculty Sponsor: Joseph Nolan

Abstract: This research focuses on using logistic regression for predictive models and classification in medical application. Potential models may be evaluated by various statistical measures (e.g. specificity, sensitivity, area under ROC curve), as well as through confidence intervals for coefficients and odds ratios. With large datasets, model validation procedures can also be used to assess predictive usefulness as well. Logistic regression models have potential to provide clinicians with an identification tool to classify patients into treatment categories and allow for development of new evaluation criteria for more efficient and statistically supported health care procedures.

19. Gesture-based American Sign Language (ASL) Translation System

Kayleigh Moore and Stefano Pecile

*Mechatronics Engineering Technology**Physics, Geology and Engineering Technology**Arts and Sciences*

Faculty Sponsor: Mahdi Yazdanpour

Abstract: We developed a pair of soft robotic gloves and a gesture-based translation interface which turns American Sign Language into text and speech. We use combination of flex and tactile sensors, and accelerometers to record hand and fingers positions, movements, and orientations. These signals will be sent to our interface and will be compared with the patterns available in our dataset using a Support Vector Machine classification model. For any matched gesture, the associated letter, number, or word will be shown. This project aims to develop an accessible solution for speakers of ASL to communicate directly to non-signer people.

20. The Equivalent Expected Value (EEV) Task: A Novel Measure of Risky Decision Making

Kevin Berling

*Neuroscience**Biological Sciences**Arts and Sciences*

Faculty Sponsor: Justin Yates

Abstract: The purpose of the current experiment was to test a novel task that measures risky decision making in rodents: the equivalent expected value (EEV) task. In the EEV task, rats chose between one of two reinforcers (food pellets). The magnitudes and probabilities associated with each reinforcer differed, but the expected value of each reinforcer was identical (e.g., 4 pellets delivered with a probability of 1 vs. 5 pellets delivered with a probability of 0.8). Using the EEV task, we found that females are more risk averse than males and that methamphetamine decreases risk aversion in both males and females.

21. Valuation Model with TransferMarkt data

Ganga Adhikari, Evan Berryman and Chase Maschinot
Data Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Yangyang Tao

Abstract: Using publicly available data from the football database TransferMarkt via Kaggle, it is possible to construct a model to get valuation for each player and team. This work regards the model of the valuations of various league clubs from multiple countries. With the player and team information as weights, the market value can be predicted. This opens up the possibility to study various topological quantities of a team using various data mining techniques.

22. Application of AI in Games

Tong Ta
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Yangyang Tao

Abstract: As applied to video game development, Artificial Intelligence serves a different purpose than general AI research. This is due to the fact that general AI is often concerned with finding a correct and/or optimal answer. However, the goal of Game AI is to simply provide a fun gameplay experience. In this research, we will investigate the agent movement, path planning, decision making, goal-oriented behavior, learning, and procedural content generation in game AI.

23. Retaliatory Tendency in the Workplace

Nicolas Gorce
Industrial-Organizational Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Philip Moberg

Abstract: Work, Life, Balance (WLB) is a goal sought by employees in exchange for their investment working in an organization. Diminished morale, greater turnover, reduced job satisfaction, and lower engagement reflect an abysmal work environment. Undesirable work assignments, mistreatment, and perceived unfairness can lead to retaliation by employees that includes sabotage of company property, verbal displays of displeasure, and encouraging coworkers to quit.

In this study we created a measure of tendency to retaliate at work and used exploratory factor analysis to find two moderately correlated factors, direct, physical and indirect, verbal retaliation behaviors and examined relations with four external measures.

24. Strategies for identifying important residues in the tRNA modification protein Trm732

Alex Mullins, Natalie Creech and Krystal Lozano
Chemistry and Biology
Chemistry and Biological Sciences
Arts and Sciences

Faculty Sponsor: Michael Guy and Holly Funk

Abstract: Post-transcriptional tRNA modifications are required for efficient protein translation. In yeast, the Trm7 methyltransferase forms a complex with Trm732 to modify tRNA at position 32. The lack of the human homolog of Trm7, FTSJ1, causes intellectual disability. Little is known about the function of Trm732, although we have identified a conserved motif that is important for tRNA modification. We are working to identify other important Trm732 residues for tRNA function using targeted and random mutagenesis. The identification of Trm732 variants that cause loss of tRNA function would help to determine how THADA, the Trm732 human homolog, is related to diseases.

25. Exploring the Connection Between Involvement and Perception of Self in Long-Term Care Residents

Samantha Mason
Social Work
School of Social Work
Honors

Faculty Sponsor: Katherina Terhune

Abstract: Research suggests that participation in activities can positively impact older adults' quality of life and outlook on aging. Studies reveal that negative self-perceptions of aging can impact one's quality of life and safety. This research explores how participation in activities impacts factors associated with quality of life and perceptions of aging in older adults in long-term care (LTC). Interviews with residents and staff at a LTC facility suggest that individuals who were highly involved in activities reported factors associated with a higher quality of life and functioning. Recommendations for LTC staff and residents will be discussed.

26. Chronic risperidone administration increases dendritic spine density in the rat hippocampus.

Caitlyn Scherpenberg, Leena Mayi and Natasha Nail
Neuroscience and Psychology
Biological Sciences and Psychological Science
Arts and Sciences

Faculty Sponsor: Mark Bardgett

Abstract: Risperidone is a widely used antipsychotic drug that blocks neurotransmitter receptors on neuronal spines. My study examined chronic risperidone administration during adulthood affects hippocampal spine density. Female and male rats were administered risperidone daily for 4 weeks. The densities of large and small apical and basal spines on hippocampal CA1 pyramidal neurons were quantified blindly in Golgi-stained sections. We found a drug-by-sex interaction which revealed that the risperidone males had significantly more large apical spines. It is possible that the increase in spine density represents a drug-induced enhancement in synaptic connectivity or an impairment in synaptic pruning.

27. Vaping-Related Lung Injury in Young Adults: A Literature Review

Sarah Shaw, Madison Woods and Grace Wernicke
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Deborah Patten

Abstract: For over a decade in the US, vaping has become the most popular tobacco product for those under the age of 21, but many are unaware of the risk factors of vaping. In this literature review, we will examine health concerns that have been identified with vaping focusing particularly on the effects to the cardiopulmonary system. After reviewing the studies, we expect to identify lung pathologies and other dangers of vaping that young adults would otherwise not recognize. Increased education on e-cigarettes and vaping associated lung injury (EVALI) may contribute to reduction in use.

28. Respiratory Therapy student employee skill set.

Kennedy Walthers
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Deborah Patten

Abstract: Under the limited student license in Kentucky, respiratory therapy (RT) students work at hospitals performing specific skills that have been successfully completed in school lab and clinical courses. Kentucky's limited license does not allow students to perform arterial blood gases and noninvasive positive pressure ventilation, (NPPV) skills they have been assessed competent prior to employment. This project will invite RT managers to answer questions about RT student employee practices. My purpose is to gather administrative opinions whether or not it would benefit hospitals and ultimately patient care if students were permitted to perform arterial punctures and NPPV.

29. What are the similarities and differences between Bronchiectasis and Cystic Fibrosis?

Jordan Turner and McKenzie Zimmer
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Deborah Patten

Abstract: The relevance between the pulmonary diseases Cystic Fibrosis and Bronchiectasis has become prevalent within recent years. As future respiratory therapists, it is important to distinguish the differences between these two chronic diseases while also recognizing the similarities in treatment plans. We will be using a review of literature to explore and gather information to provide healthcare practitioners and patients with the most current evidence-based practices. The research that will be gathered will include the etiology, epidemiology, clinical manifestations, and treatments. Through our findings, we hope to improve knowledge and clinical management of persons with Cystic Fibrosis and Bronchiectasis.

30. Public health literacy on the usage of antibiotics and awareness of antibiotic resistance

Suellen Smith
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Deborah Patten

Abstract: Antibiotic resistance is increasing across the world. This occurs when simple bacterial infections do not respond to antibiotics once commonly used to fight against them. Addressing the problem of antibiotic resistance starts with education: increasing awareness and knowledge about this important healthcare issue. This project will invite the NKU campus community to answer a brief questionnaire about antibiotic usage and resistance. In the results I hope to identify gaps in awareness and knowledge of antibiotic resistance to improve patient compliance and ultimately their health.

31. Comparison of Shared Competencies between Nursing and Respiratory Policies: Tracheostomy Care

Justin Skidmore, Alex Centers and Nigel Collins
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Debbie Patten

Abstract: We have observed in our clinical experiences in school and as student respiratory care practitioners that tracheostomy care, a shared nursing and respiratory competency, can be improved by comparing the policies between Respiratory and Nursing. In our anecdotal experience, some nurses have expressed non-confidence to provide tracheostomy care. Our project is to compare nursing tracheostomy procedures to respiratory procedures through multiple hospitals to see if there are any differences. Our hope with this project is to improve confidence and competence in tracheostomy care.

32. Overuse of Albuterol

Mackenzie Doubrava, Brooke Strickland and Mary Gray
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Deborah Patten

Abstract: Respiratory therapists play a vital role in educating asthma patients. Many patients with asthma do not understand proper symptom management. Albuterol is the rescue inhaler for short term symptom relief for asthma. The overuse of albuterol can cause psychological and physiological complications. The purpose of this literature review is to further the understanding of how the overuse of albuterol has these negative effects. The information provided within this review comes from the Global Initiative for Asthma and peer reviewed journals. We hope the findings will benefit asthmatics and the medical professionals who provide care for them.

33. The Negatives of Neural Network Technology

Blake Jaggers
Computer Science
School of Computing and Analytics
Informatics
Honors

Faculty Sponsor: Gary Newell

Abstract: Artificial Intelligence (AI) has become a frequently used phrase, in headlines across the globe, with advancements in neural networks and Deep Learning algorithms fueling a wide-variety of innovations. With neural networks being the cutting edge of the field, this study aims to clarify and reiterate the weaknesses and addresses concerns of the use of such networks, to avoid overestimating their abilities. This study examines the physical, logical, and ethical drawbacks of neural networks. We then discuss what the future of the field could be and consider whether progress will continue or rather decline with further use of current technology.

34. Development of a Low-Cost Wind Turbine Emulator for Research and Educational Purposes

Omkar Bhat

Mechatronics Engineering

Physics, Geology and Engineering Technology

Arts and Sciences

Faculty Sponsor: Zeel Maheshwari

Abstract: Wind speed is intermittent in nature yielding variable power. Factors such as space consumed, costs, and time consumption confine the research conducted on wind turbines, especially in universities. The developed emulator mimics the behavior of wind turbines for hardware-level simulation and addresses the drawbacks of a real-life wind turbine. The software component is based on LabVIEW with a hardware interface of a motor-driven generator which reproduces characteristics of a given wind turbine at any wind velocity. The user can input a 24-hour wind profile through an excel file and differentiate between high and low-speed wind days.

35. Mushroom Classification Using Machine Learning Techniques

Branden Fierro and Mitchell Warren

Applied Mathematics

Mathematics and Statistics

Arts and Sciences

Faculty Sponsor: Junxiu Zhou

Abstract: Mushroom hunting has become more popular in recent years, leading to an increase in hospitalizations from poisonous mushroom consumption. This leads to a need to classify mushrooms as edible or poisonous. Machine Learning algorithms can be utilized to accurately complete this task. Data points regarding mushroom features will be given to a computer program with the correct classification to train the machine learning model. New data points will then be given for our trained machine learning model to classify, and a final accuracy score will be calculated.

36. Identifying habitat conservation areas for the Streamside Salamander in Northern Kentucky with use of GIS

Jensyn Scott, Emily Dobbs, Farber Tami, and Chrisula Stone

Biology and Data Science

Biological Sciences and School of Computing and Analytics

Arts and Sciences and Informatics

Faculty Sponsor: Hongmei Wang

Abstract: The Streamside Salamander was included in 2011 on a USFWS list of potentially threatened wildlife. A key factor here was destruction of suitable habitat. Studies on the abundance and preferred habitats of *Ambystoma barbouri* have been conducted, but dedicated conservation sites have yet to be established. The goal of this study is to identify appropriate habitat conservation areas in Northern Kentucky for this species. GIS datasets, including tree cover, elevation, and distance to a water source, are analyzed to identify habitat conservation areas for this species. The study results aid conservationists in allocating resources to preserving optimal habitat.

37. Examining the Effectiveness of Conservation Marketing: Rock Climbing and the Red River Gorge Climbers Coalition

Alexander Trimpe

Marketing

Marketing, Sports Business and Construction Management

Business

Honors

Faculty Sponsor: David Raska

Abstract: The Red River Gorge National Geologic Area is a popular climbing destination that is at risk of negative environmental repercussions from unsustainable tourism practices. The Red River Gorge Climbers Coalition is a non-profit organization that plays a vital role in protecting the Gorge, through land management and securing ample spaces for climbers. My research addresses how RRGCC can secure proper funding to optimize their protection of the environment. Through secondary data research, I synthesized a story highlighting how the RRGCC can increase funding through expanding partnerships and strengthening grassroots community relationships.

38. Second-Generation Viral Vectored Vaccines for Hepatitis C Virus

Phat Nguyen and Taylor Peach

Biological Sciences

Arts and Sciences

Faculty Sponsor: Joseph Mester

Abstract: Hepatitis C virus (HCV) is a blood-borne pathogen that causes liver failure and carcinoma. Infection by HCV is frequently life-long and transmitted during the early asymptomatic stage. Our research lab's current focus is on testing newly designed vaccines for HCV. In this study, codon-optimized genes for the 3 structural proteins of HCV (Core, E1, and E2) were cloned into a non-replicating vaccine vector based on the herpes simplex virus. The expression and immunogenicity of the HCV targets were examined in human cells. We hypothesize that the HCV proteins expressed by the new HCV vaccines will promote protective immune responses. These vaccines may stop the spread and harmful effects of the Hepatitis C Virus.

39. Synthesis and Characterization of Lumiestrone

Gabrielle A. Kerr, Lillian M. Lown, Elma Coric, Richard Seibert, and August Bozarth

Biochemistry

Chemistry

Arts and Sciences

Faculty Sponsor: Patrick M. Hare

Abstract: Estrone is a pervasive estrogenic byproduct of these industries that is difficult to remove from water. Photodegradation of estrone could prove to be a useful remediation technique. Estrone's dominant photoproduct, 13a-estrone (lumiestrone) is less estrogenically active, and its photochemical pathways are largely unknown. To study the photoproducts and photophysical characteristics of lumiestrone, a one-pot synthesis of it has been carried out, but purifying this epimer of estrone has been a challenge. A variety of purification methods have been investigated, with NMR and high-resolution mass spectrometry used to determine purity. Lumiestrone has been found to photodegrade more slowly than estrone under UV light, and products, including a solvent addition, have been identified. This work will aid in the further study of the full photochemical pathways of estrone, and aid in developing methods for purifying water via UV photolysis.

40. Photophysical and photochemical studies of equilin

August Bozarth

Chemistry and Physics

Chemistry

Arts and Sciences

Faculty Sponsor: Patrick M. Hare

Abstract: The natural estrogen estrone has been found in many waterways and has proven both damaging to wildlife and difficult to remove. A better understanding of the photochemical pathways of this molecule can give insight into possible remediation strategies. Equilin is structurally similar to estrone, so its photophysics and photochemistry were studied to better understand estrone. Equilin's absorption and fluorescence spectra are largely the same as estrone's, but with a higher fluorescence quantum yield, lower 410 nm emission, and a faster lifetime in this band. Equilin's UV photodegradation rate was found to be slower than estrone's. The most notable photoproducts identified by high-resolution mass spectrometry are similar to estrone's but with different relative yields. Structure-based conclusions about estrone and equilin, particularly the importance of the planarity of the molecule for photodegradation and emission at 410 nm, provide useful insight into photodegradation as a tool for removal of estrone from water.

41. Work Recovery Scale

Amara Marrero-Torres, Patricia Gullett, Aubree Kerle, Sarah Parlow, and Evelyn Madill-Hughes

Industrial and Organizational Psychology

Psychological Science

Arts and Sciences

Faculty Sponsor: Phil Moberg

Abstract: The purpose of our study was to provide a measure to assess short-term work recovery. After reviewing the existing literature, we constructed a new scale to represent two dimensions of the work recovery process proposed by Sonnentag et al., 2022, unwinding and restoration. Participants endorsed items using a Likert response format ranging from 1 (strongly disagree) to 5 (strongly agree). Exploratory factor analysis using principal axis factoring with oblique rotation revealed three correlated dimensions that were significantly related to measures of burnout, detachment, and occupational fatigue. Future directions include the use of our scale to assess work recovery in organizations.

42. Defining the role of tRNAPhe anticodon loop modifications in *Saccharomyces cerevisiae* through stress testing with acetic acid

Michaela Vogel
Chemistry
Arts and Sciences
Honors

Faculty Sponsor: Michael Guy

Abstract: In the yeast *Saccharomyces cerevisiae* tRNA posttranscriptional modifications are crucial for translation. Methyl groups added to the 2'-O position of nucleotides C32 and G34 of tRNA are particularly important. The protein Trm7 interacts with proteins Trm732 and Trm734 to modify C32 and G34. Yeast lacking modification on C32 and G34 grow slowly, but yeast lacking only one of the modifications are healthy. Using a series of spot tests and growth curves we are testing the ability of yeast lacking modification at C32 or C34 to grow under stress, focusing on growth in the presence of acetic acid.

43. The effect of DEET and permethrin on insect succession in decomposing rat carcasses

Mitchell Ketron
Biology
Biological Sciences
Arts and Sciences
Honors

Faculty Sponsor: Allison Parker

Abstract: This forensic entomology study will analyze the potential impact that DEET and permethrin have on insect succession in decomposing organisms. Rat carcasses will be sprayed with one of three treatments: DEET, permethrin, or a water treatment control. We hypothesize that the DEET group will have less insects as well as a different composition of insects and that the permethrin group will see a slight decrease and change in insects present when compared to the control group. The results will add to forensic entomology research by showing how these chemicals change insect density and species over the decomposition process.

44. Artificial Intelligence Music Generation

Jacob Kessinger
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Richard Fox

Abstract: As Artificial Intelligence (AI) algorithms become more advanced, these algorithms are being used to solve numerous problems in the fields of mathematics and science. However, the problems in these fields have a definitive answer, as opposed to open-ended problems such as those encountered in the arts. Dr. Fox and I explored the possibility of an AI algorithm creating art, specifically music. We developed an AI system that would compose a song using user input, stochastic processing, and a genetic algorithm, resulting in a MIDI file containing the generated song.

45. Respiratory Management for children with Down Syndrome

Jessica Quirizumbay
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Debbie Patten

Abstract: Down Syndrome(DS) is the most common genetic cause of developmental delay in infants. These children develop respiratory complications of ear, nose, throat and other respiratory diseases.¹ The upper respiratory tract in these children is often narrow due to congenital and associated conditions; the trachea and mainstem bronchi are often smaller contributing to recurrent pneumonia. Impaired immunity and structural lesions also contribute to complications. As respiratory therapists we must be informed of the best way to care for these children. In this review of literature I hope to provide evidence based practices to evaluate and manage DS children with respiratory complications.

46. Image classification Machine Learning model to identify the breast cancer cells.

Manogya Aryal, Saumya Sharma and Alex Jones
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Junxiu Zhou

Abstract: Breast cancer is the second leading cause of cancer deaths in women so early detection is important. This project proposes a method for identifying breast cancer cells from ultrasound images of 500*500 pixels using Machine Learning Techniques. The images of breast masses are labeled as normal, benign, or malignant. Our approach involves using data augmentation techniques to generate additional training data and fine-tuning some pre-trained models. Our target is to show that our model can accurately classify breast masses with potential implications for improving breast cancer screening and diagnosis.

47. Development of a PLC-Based Industrial Automation Training Platform

Wen Liu and Lauren Williams
MMET
Physics, Geology and Engineering Technology
Arts and Sciences

Faculty Sponsor: Gang Sun

Abstract: The use of Programmable Logic Controllers (PLCs) in industries has gradually grown by each year over the past twenty years. Higher education institutions have paid more attention to developing their PLC classes. Bringing the real industrial environment and equipment to the courses and labs for achieving hands-on experiences is one of the main philosophies for engineering education. However, due to the high cost of industrial PLCs and the limit on the funding. Many institutions have come up with many different solutions. With the support from Rockwell Automation, Northern Kentucky University Mechatronics lab equip advanced Allen-Bradley GuardLogix 5580 PLCs with RSLogix 5000 programming software, PowerFlex AC drives, and HMIs, etc. Previous research was done on the physical Human-machine interface, a physical control panel was developed to interact with the PLC controller. This research aims to use Easy PLC software to achieve an industrial work environment simulation on the computer with the existing platform. Easy PLC soft allows a real time communication with PLC and its software, we will be able to create a simulated animation on computer that gives input and output feedback based on this platform. We have created two template that represent two most frequently seen industrial environment on Northern Kentucky area: A mix tank simulation and a conveyor factory simulation.

48. One-pot reaction of pyruvate carboxylase and phosphoenolpyruvate carboxykinase for the production of deuterated phosphoenolpyruvate

Liat Ungar
Biology
Biological Sciences
Arts and Sciences
Honors

Faculty Sponsor: Catherine Shelton

Abstract: There is growing concern over antibiotic resistant bacteria as infections increase and the production of new antibiotics decreases. The MST enzymes are potential targets for novel antibiotics. Deuterated chorismate, the substrate for all MST enzymes, is necessary for studying the enzymes. The deuterated chorismate is being produced through the reconstitution of the seven-enzyme shikimate pathway which reacts phosphoenolpyruvate (PEP) and erythrose-4-phosphate. The goal of this research is to generate deuterium labeled PEP to feed into the reconstituted shikimate pathway. A one-pot reaction using pyruvate carboxylase (PycA) and PEP carboxykinase (PckA) is being developed to convert labelled pyruvate to labelled phosphoenolpyruvate.

49. Prevalence of antibiotic resistance bacteria in freshwater ecosystems affected by wastewater effluent

Elisha Redman
Biology and Environmental Science
Biological Sciences
Arts and Sciences

Faculty Sponsor: Joshua Cooper

Abstract: Aquatic ecosystems are ideal for the spread of antibiotic-resistant bacteria (ARBs). A component of older wastewater treatment plants (WWTP) are combined sewer outflows (CSOs), which release sewer and rainwater into aquatic communities during high precipitation periods, potentially exposing them to antimicrobial compounds. CSOs on the Kentucky side of the Ohio River are more prevalent in the upper watershed, while the rural upper watershed of the Licking River has few. Samples near CSOs had higher ARB abundance in both rivers. The resistome around Northern Kentucky is composed of bacteria resistant to Ciprofloxacin, Lincomycin, Kanamycin, Penicillin, Trimethoprim, and Tetracycline.

50. Impact of Synthetic Sweeteners on the Human Oral Microflora

Connor Stahl

Biology

Biological Sciences

Arts and Sciences

Honors

Faculty Sponsor: Joe Mester

Abstract: Synthetic sweeteners are present in many products, such as sugar free gum and diet soda. These sweeteners exist as dietary substitutes for natural sugars such as sucrose (table sugar). When natural sugars are consumed, the bacteria in the oral microbiome convert them into acid, which can wear down the enamel (outer layer/protective coat) of the teeth and cause dental caries/cavities. Sugar alcohols (xylitol, sorbitol, and mannitol) have demonstrated inhibitory effects on oral bacteria and may limit acid production in the mouth. There is less known about the effects of other artificial sweeteners such as aspartame, sucralose, and saccharin on the oral microflora. This project compared the inhibitory effects of aspartame, acesulfame, saccharin, sucralose, xylitol, and mannitol on the growth of oral bacteria. Changes in pH were also observed to determine any effect of the synthetic sweeteners on acid production by the bacteria. Our results will indicate which artificial sweeteners have the greatest inhibitory effect on the human oral microflora and may identify new applications for synthetic sweeteners in dental health and hygiene.

51. ImageJ modification used for macroinvertebrates biomass assessment

Tina Moghimi

Biology

Biological Sciences

Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Aquatic macroinvertebrates are an important base in the food web. Historic length/mass ratios inadequately provide a measure of biomass. Our new surface area/mass measurements increase accuracy and precision. We used ImageJ, a java-based processing program to improve access to measurements for researchers. Images of the macroinvertebrates were taken, surface area was analyzed, and then statistical tests were performed to assess ImageJ as a processing program. In addition to the multiple functions, ImageJ can analyze multiple organisms in a single image, making this method quick and efficient. ImageJ's strength is that it is functional and freely accessible on the internet.

52. A quantitative trading algorithm

Trang Do

Data Science

School of Computing and Analytics

Informatics

Faculty Sponsor: Yangyang Tao

Abstract: Quantitative trading strategies involve the use of mathematical and statistical models to analyze and predict market movements, allowing traders to make informed investment decisions. In this project, I will use clustering methods to cluster the stocks and create a diversified portfolio. Then I will utilize historical financial data of the constituents of the S&P500 index to fit machine learning algorithms such as Long-Short Term Memory (LSTM) and Support Vector Machine, backtest and evaluate the performance of the trading algorithm. The algorithm aims to predict stock prices and trends in order to determine the best time to buy and sell stocks.

53. Framing Weather Data for comparison of passerine breeding success

Tami Farber

Data Science

School of Computing and Analytics

Informatics

Faculty Sponsor: Yangyang Tao

Abstract: A concern sparked by climate change is how unseasonal temperature swings affect the fitness of biological organisms. Passerine breeding success depends largely on constant incubation temperature. Though birds can acclimatize to some temperature fluctuations, studies of the tolerance thresholds during the breeding season are scarce. In this study, we model trough-peak intervals using ten years of regional weather data and test for correlation in breeding success for the same area and time-frame. Tests of the minimum temperatures falling below 5-6°C are expected to correlate with brood failures. Once the thresholds are identified, intervention protocol can be established by conservationists.

54. Impact of Invasive Plants on Amphibian Morphology and Phenology

Jensyn Scott and Alex Walsh

Biology

Biological Sciences

Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Invasive organisms have been known to greatly impact ecosystems, from outcompeting native organisms to changing soil and water chemistry. Amphibians are particularly sensitive to changes in their habitat. St. Anne's Woods and Wetlands is a project site in Melbourne, KY that is split into two regions; invasive plant removal has occurred at one but not the other. Biodiversity assessments have been conducted at these sites, including collecting morphological data and sound recordings. The goal of this project is to determine if the presence of invasive plants has an impact on the morphology and phenology of amphibian at these sites.

55. The Transfer of Morale through Social Interactions in the Workplace

Jessica Hamm, John Staley, Jared Gilliam, Kelli Handorf, and Webster Ruter

Industrial-Organizational Psychology

Psychological Science

Arts and Sciences

Faculty Sponsor: Philip Moberg

Abstract: Recent research has begun to explore how emotions are transferred between individuals in workplace settings. The literature has also studied the social components of organizations extensively. Despite the prominence of morale in workplace settings, few efforts have merged these paths to understand the contagiousness of morale within the social context of work. We attempted to investigate morale that is transferred in the workplace via social interactions by developing the Morale as a Social Contagion Scale. A factor analysis revealed three dimensions of social contagion that correlated in different patterns with job satisfaction, social connectedness, and job engagement.

56. Detecting AGN in Extreme X-ray Flux States with Swift

Jonathan Blatnik and Faith Mathew

Physics and Engineering Physics

Physics, Geology and Engineering Technology

Arts and Sciences

Faculty Sponsor: Dirk Grupe

Abstract: We will report on a long-time monitoring campaign of more than 100 Active Galactic Nuclei (AGN) with the NASA Neil Gehrels Swift mission in order to detect AGN in extreme X-ray flux states. A detection will trigger follow up observations with two other X-ray missions, XMM-Newton and NuSTAR. The long-term Swift monitoring campaign allows us to better understand the long-term changes of the AGN properties, for example the development of the accretion rate and that of an line of sight absorber. The XMM-Newton and NuSTAR observation allow for a study of the ionized matter closest to the central super-massive black hole. These observing campaigns have been very successful over the last decade and several examples of follow-up observations will be presented and discussed.

57. Impacts of the Invasive Podarcis muralis on Native Skink Species in Northern Kentucky

Bailey Davis

Environmental Science

Biological Sciences

Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Podarcis muralis, the European wall lizard, is an introduced species abundant in Northern Kentucky observed inhabiting urban areas and rocky and wooded habitats. Native skink populations can occupy similar wooded habitats but less so in urban and rocky areas. With a smaller fundamental niche for native skink populations we set up experiments to test how competitive these two species are at capturing food and occupying shelter. We use 500 gal tubs set-up with a single shelter, a food source, or both and recorded time to occupancy-food for each species individually and then competition winners with both species together.

58. Emotion-based Machine Learning Model for Predicting Fake Restaurant Reviews

Bijay Rimal

Mathematics

Mathematics and Statistics

Arts and Sciences

Honors

Faculty Sponsor: Seth Adjei and Anh Dang

Abstract: This research project aims to develop models to predict fake restaurant reviews by analyzing the emotions. Using an existing Emoroberta model, we calculate scores for 28 emotions present in the reviews. We then build logistic regression and Multi Layer Perceptron models to identify fake reviews based on these scores. The study aims to contribute to sentiment analysis by creating an accurate model that can help customers make informed decisions while choosing a restaurant. The findings could be useful for restaurant owners, customers, and researchers analyzing restaurant reviews. Fake reviews are a growing problem in the industry, making this research necessary.

59. Determining the cause of high neonatal mortality following benzo[a]pyrene exposure in Cyp1b1(-/-) knockout mice

Briannia Quarles, Angela Kyntchev, India Davis, Connor Perry and Mickayla Kowalski

Biology and Neuroscience

Biological Sciences

Arts and Sciences

Honors

Faculty Sponsor: Christine Perdan Curran

Abstract: Benzo[a]pyrene is a carcinogen produced from combustion of fossil fuels, cigarette smoking, wildfires, and grilled food. Recent human studies found a higher risk of cognitive and behavioral problems in children exposed to high levels of pollution during pregnancy and early life. We use a mouse model to determine if genetic differences increase the risk of developmental BaP exposure. In our current studies using Cyp1b1(-/-) knockout mice, we found unusually high mortality in the offspring shortly after birth. We are testing the dam (mother) behavior as well as levels of BaP in tissues to determine what is causing the higher mortality.

60. Genetic makeup in relation to motor skill deficiency in Cyp1b1(-/-) mice following developmental benzo[a]pyrene exposure

Alexandria Frances Urbanek, Kayla Wypasek, Mickayla

Kowalski, Connor Perry and Angela Kyntchev

Biology and Neuroscience

Biological Sciences

Arts and Sciences

Honors

Faculty Sponsor: Christine Perdan Curran

Abstract: Benzo[a]pyrene (BaP) is a common pollutant from traffic, grilled foods and smoke. It can cause cancer and decrease the cognitive and motor function following exposure during pregnancy and early life. CYP1B1 is an enzyme capable of metabolizing BaP, so we are using Cyp1b1(-/-) knockout mice to determine if they are more susceptible to BaP exposure. We test the mice as young adults to look for persistent effects on brain function. We used a Roto-Rod to assess motor coordination. The mice are placed on a rotating rod that increases in speed. Mice with motor deficits will fall off sooner than controls.

61. Respiration rates in Plethodontid larvae

Sam North

Biology

Biological Sciences

Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Some salamanders have a life history like other amphibians, with three distinct stages, egg, larvae, and adult. Larval salamanders have external gills and use counter-current flow to perform gas exchange in an aquatic environment. External factors such as conductivity and water quality may affect a larval salamander's ability to efficiently absorb oxygen from the water by altering their metabolism. To investigate this, we began preliminary testing on larval salamanders from the species *Eurycea cirrigera*, using a respirometry system to measure dissolved oxygen levels in a closed-circuit system. These measurements are under different conductivity levels.

62. Classifying Star Types Using Machine Learning

Lauren Pennell
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Junxiu Zhou

Abstract: Anyone familiar with astronomy can tell you that the majority of data being used within the field isn't the beautiful photos of space we see from James Webb or Hubble. Almost all of the data is numbers and measurements that need to be calculated, compared, and classified with precision and speed. This project attempts to leverage the machine learning technique to classify stars into different categories for example, Red Dwarf, Brown Dwarf, White Dwarf, etc. This machine learning-based star classification project may help astronomers identify different stars and provide reliable results to work with.

63. Overcoming Cultural and Language Barriers when Providing Medical Care to the Local Hispanic/Latino Population in the Cincinnati and Northern Kentucky Area

Julia Bottoms
Organizational Leadership
World Languages and Literature
Arts and Sciences
Honors

Faculty Sponsor: Heleen Giesbers

Abstract: Studies have shown that clear patient-clinician communication is vital in providing quality healthcare. Increasing populations of non-English speakers are left at the margins without the help of effective medical interpreting services. In this study, medical care providers and medical interpreters are surveyed to gain insight on availability, benefits, and limitations of medical interpreting services (in-person, virtual, or over-the-phone). The survey includes multiple choice, Likert scale, and free response questions, to gain a deeper understanding of how to help bridge the cultural and language gap between medical care providers and non-English speaking Hispanic/Latino patients.

64. Novel DNA-based Vaccines for HCV

Taylor Peach, Jorggedyg Castillo-Perez and Jessica Bryndal
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Joseph Mester

Abstract: We are developing novel DNA-based vaccines for hepatitis C virus (HCV). 58 million people worldwide are chronically infected by HCV, and there is no current vaccine. Our DNA-based vaccines target the three structural proteins of HCV (Core, E1, and E2). Expression of the HCV targets was verified in human cells after exposure to the vaccines. Ongoing experiments will determine the extent of immune activation by these newly developed DNA-based vaccines. These results may lead the way for developing a vaccine that can be used around the world to prevent HCV.

65. Defining the binding of Trm7, Trm732, and Trm734 proteins to tRNA-Phe

Anabel Lillie and Samuel Seibert
Biochemistry and Chemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Michael Guy

Abstract: Post-transcriptional 2'-O-ribose methylations on the tRNA-Phe anticodon loop in *Saccharomyces cerevisiae* (baker's yeast) are formed by the protein Trm7, which requires interaction with its binding partners Trm732 and Trm734 separately to methylate respective nucleotides C32 and G34. FTSJ1 is the human ortholog of Trm7, and mutations in FTSJ1 cause intellectual disability. Yeast mutants lacking Trm7 grow poorly due to lack of the tRNA modifications. Trm734 and Trm732 are important for cell growth, but little is known about their specific role in tRNA modification. We are purifying Trm7 and its partner proteins to perform experiments to study protein-tRNA interactions.

66. Student Photography Study

Kylie Hicks
*Psychology, Neuroscience
 Psychological Science
 Arts and Sciences*

Faculty Sponsor: Kathleen Fuegen and Kimberly Breitenbecher

Abstract: Research has demonstrated time in nature can positively impact mood. The current study investigated the influence of outward and inward focus while walking in nature. Participants were randomly assigned to two conditions representing each focus. We instructed participants in the environment condition to take photographs of nature while walking on a nature trail. We instructed participants to take photographs of themselves in the selfie condition. Participants responded to surveys to assess mood and energy. We also measured participants' pain tolerance during a cold pressor task. Data analysis is currently in progress.

67. Improving Representation of Minority Communities in Healthcare

Olivia Allen
*Biology
 Biological Sciences
 Honors*

Faculty Sponsor: James Buss

Abstract: Throughout history, African Americans have been largely discriminated against by the American healthcare system. Black physicians were excluded from national medical societies, Black patients receive inequitable care, and Black applicants to medical programs have to continually break a racial glass ceiling. By implementing a holistic admissions evaluation, providing cultural competency training, transforming community outreach, and increasing the rate of racial concordance in medical practices, previously unethical healthcare systems will experience an increase in trust from African American communities and consequently improved patient outcomes.

68. Recipe Recommendation

Tewodros Amare
*Computer Science
 School of Computing and Analytics
 Informatics
 Honors*

Faculty Sponsor: Junxiu Zhou

Abstract: The Recipe Recommendations project aims to create a convenient cooking experience for individuals by providing a personalized recipe recommendations based on available ingredients. It addresses the lack of efficient and convenient methods for finding recipes using available ingredients. The project is scoped to build a prototype that uses data from online recipe websites. The system employs preprocessing techniques to prepare the data for machine learning analysis using Latent Dirichlet Algorithm (LDA) model. The prototype successfully generates a list of recipes that match all or part of the ingredients and continues to explore other techniques to enhance the recommendations.

69. Tropical Corals Respond Differentially to Light Spectra

Chloe Donithan, Hannah Taulbee and Lydia Goins
*Biology
 Biological Sciences
 Arts and Sciences*

Faculty Sponsor: Charles Acosta

Abstract: Degradation of tropical coral reefs by "bleaching" is expected to increase with global climate change. Rising temperature is known to initiate bleaching, but studies indicate that maladaptation to variation in light is the actual cause of coral mortality. In the Coral Propagation Laboratory at NKU, we have been studying responses to variation in light spectra, light intensity, and photoperiod in several species of corals. Our preliminary data and analyses suggest that maximum growth rates occur under short-wavelength spectra (blue-violet rather than red-yellow). Further work may give us insight into adaptations of different species at different ocean depths.

70. Bioinformatics approach for the identification of a box C/D guide RNA responsible for the Nm39 modification of tRNA

Ashton Davey

Data Science

School of Computing and Analytics

Informatics

Faculty Sponsor: Michael Guy

Abstract: tRNA modifications play an important role in translation. The 2'-O-methylation of tRNA position 39 only occurs in multicellular eukaryotes, and the responsible enzyme is unknown. This modification could be carried out by a box C/D guide RNA. I used PLEXY, a bioinformatics script, to identify guide RNA targets. Results show several potential guide RNAs which were then validated using a dataset of known RNA-RNA hybrids. I will test the requirement for guide RNAs in cultured cells by knocking genes down and testing for the presence or absence of 2'-O-methylation using partial base hydrolysis and primer extension.

72. The Parker's: A Family's Determination For A Better Future

Jay Utz and Grace Pfanstiel

Criminal Justice and Anthropology

Sociology, Anthropology and Philosophy

Arts and Sciences

Faculty Sponsor: Sharyn Jones and William Landon

Abstract: The portrayal of historical figures is often single-sided as opposed to multi-faceted; this causes many to view historical figures as ideas rather than people. By creating kinship charts to address who the Parker family of Clermont Academy were, these people become humanized. Using comprehensive archival family accounts and stories to decipher some of the families' relationships, ideas, influences, and motivations; their life history becomes clearer. The Academy ran through the ambitions of the founding Parkers, and via marriages and children who were united by their belief that everyone has a right to an adequate education, regardless of race.

73. Soul City: The Abandoned Dream

Amari Johnson

History

Arts and Sciences

Faculty Sponsor: Burke Miller

Abstract: Soul City was a dream birthed from the heart of civil rights activist Floyd B. McKissick in 1969. His plan was to build a community for those of African descent to live in peace. With help from fellow civil rights activists, the Nixon administration, and the U.S. Department of Housing and Urban Development, McKissick received a \$14 million grant for the development of Soul City in North Carolina. What was originally a dream that was extremely close to reality, crumbled just as quickly as it manifested itself. Racism and bureaucratic attacks aided in its downfall and abandonment.

74. A Brief Shining Moment: Kennedy's Camelot

Katrina Kursell

History

Arts and Sciences

Faculty Sponsor: Burke Miller

Abstract: "Don't let it be forgot, that once there was a spot, for one brief shining moment, that was know as Camelot." Everyone knows about John F. Kennedy's assassination, but few know how the story of his life was represented in a captivating legend. When JFK spoke of passing the torch to a new generation of Americans, many saw him as King Arthur calling them to become his Knights of the Round Table. In my retelling of Kennedy's Camelot, Bobby Kennedy represents the dashing Lancelot, Jackie Kennedy, the luminous Guinevere, and Lyndon B. Johnson, the despicable Mordred.

75. College student attitudes toward bioplastics

Ngoc Minh Thao Nguyen
Environmental Science
Biological Sciences
Arts and Sciences
Honors

Faculty Sponsor: Christine Perdan Curran

Abstract: Global plastic production exceeded 360 million tons in 2020 and is estimated to have increased 9% every year since 1950. Bioplastics made from plants were introduced as a potential replacement for traditional, petroleum-based plastics. In addition to reducing fossil fuel use, many bioplastics are biodegradable or compostable. This greatly reduces their environmental impact. However, recent studies identified cost as a key factor that could limit the adoption of bioplastics by consumers. This project will use an online survey to determine which factors are most likely to influence college students' decisions on whether or not to purchase products made from bioplastics.

76. Exploring Ceramic Styles Through the Parker Academy Archeological Analysis

Natalia Munoz and Anna Wagner
Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Sharyn Jones and William Landon

Abstract: The Parker Academy was an education center in New Richmond, Ohio running from 1839-1892. The school is one of the first in the United States to establish a multi-race and coeducational classroom environment. This inclusive school had residential students coming from many different backgrounds, culturally and economically. The archeological excavations yielded multiple types of historical ceramics that tell an interesting story about daily life. Based on our analysis of this material and a consideration of the other artifacts, we created a timeline demonstrating the trends in 1800s ceramics used by this group of people from vastly different backgrounds.

77. The Extent of Public Culture's Legal Misconceptions

Calli Antle
Law
Political Science, Criminal Justice, and Organizational Leadership
Arts & Sciences
Honors

Faculty Sponsor: Jonathan McKenzie

Abstract: Research has shown that popular culture affects public perception of the court system. Television is altering the judgements of everyday people and trial participants, creating a new relationship between the court system and the media. I present further exploration into this relationship reaching throughout the internet and into everyday life. To do this I researched popular media in order to collect data on legal misunderstandings in the general populace, revealing how widespread these problems are. This study supports and supplements former research done showing that there is a negative relationship between popular culture and the law.

VIRTUAL PRESENTATIONS

Impact of Generational Differences and Attitudes on Aging

Callie Elder
Biological Sciences
Honors

Faculty Sponsor: Suk-hee Kim

Abstract: The purpose of the study is to examine people's attitudes about aging, how their attitudes change, and what attitudes are involved to prevent aging between different generations and their influences on how people view aging. The study aims to help people better understand themselves and others as they age. An online survey was distributed on university campus to statistically analyze collected primary qualitative and quantitative data. The outcome of the study will examine and assist in advocating for attitudes change about aging on the university campus.

Tick Species Distribution across the Northern Kentucky Region

Maira Faisal, Nancy Le and Trey Zinsmeister
Biology and Environmental Science
Biological Sciences
Arts and Sciences

Faculty Sponsor: Allison Parker

Abstract: Ticks are one of many known vectors of diseases that can infect humans and other animals. This study examines the distribution and seasonality of tick species in the Northern Kentucky region. Starting in June 2022, ticks have been regularly collected at five rural sites. Forty-eight American dog ticks (*Dermacentor variabilis*), 91 black-legged ticks (*Ixodes scapularis*), and two Lone Star ticks (*Amblyomma americanum*) have been collected totaling 145 ticks. Sampling is continuing through August 2024. Understanding the distribution and seasonality of tick species in the region will ultimately allow for more effective control strategies to reduce ticks and tick-borne diseases.

A Qualitative Analysis of the Student Caregiver Experience

Nicole Goldizen
Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Allyson Graf

Abstract: In the United States, 44 million adults provide unpaid care to family and friends. Those enrolled in college comprise over 10% of that population. Little is known about the experiences of student caregivers other than they are frequently trying to balance care responsibilities with school and work. Our goal was to identify student caregivers and determine what resources an institution or community partner could provide to make their lives more manageable. This presentation will share results from focus groups with N = 16 student caregivers, showcasing the diversity of caregiving experiences but also common themes around support and financial need.

Review article on the effects of social media on people's mental health

Nam Ngo
Computer Science
School of Computing and Analytics
Informatics
Honors

Faculty Sponsor: Amanda Brockman

Abstract: This review article provides a comprehensive analysis of the positive and negative effects of social media on mental health. Social media has become an integral part of daily life for many people and its impact on mental health has generated a significant amount of research. This article synthesizes the available evidence on the relationship between social media use and mental health outcomes, focusing on both positive and negative effects. Positive effects of social media use on mental health include social connection, self-expression and educational resources. However, social comparison, cyberbullying, addiction and the emergence of mental health issues including anxiety and depression are among the harmful effects of social media use on mental health. Overall, this review provides a balanced assessment of the complex relationship between social media use and mental health, highlighting the need for continued research in this area.

Human Trafficking Awareness, Prevention, and Resources on University Campus

Madison Beichler
Social Work
School of Social Work
Health and Human Services

Faculty Sponsor: Suk-hee Kim

Abstract: Human trafficking is a problem occurring globally. Human trafficking can affect anyone and it can occur in many ways. This study sought out to understand what resources are currently available to determine an university's educational material about human trafficking. The primary data from this study comes from systematic review between years and the findings report back what other studies have found in consideration to higher education's effectiveness in educating their students. This study also sought out to determine methods to improve the resources available through looking at previous studies done.

Sex differences in grooming strategies among wild juvenile olive baboons at the Uaso Ngiri Baboon Project, Laikipia, Kenya.

McKenzie Ingalls, Ansley Cahill and Marissa Vestal
Integrative Studies and Anthropology
Integrative Studies and Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Monica Wakefield

Abstract: Social grooming in olive baboons (*Papio anubis*) is vital to the development of social relationships, which begins at the juvenile life-stage. We used data collected on 65 juveniles to examine grooming patterns and test hypotheses about sex and age differences of juveniles in grooming strategies. Our results demonstrated clear differences between male and female juvenile grooming patterns, females groomed more frequently than males and were more likely to give grooming to partners and males to receive. As juveniles are often excluded from social grooming analyses, our results contribute to a broader understanding of the developmental process of baboon social dynamics.

Race/Ethnicity and its Impact on Perspectives of Modern Environmental Issues

Presley Riggs
Environmental Sciences
Biological Sciences
Arts and Sciences
Honors

Faculty Sponsor: Allison Parker

Abstract: This Capstone Project examines that correlation between race and ethnicity and views of environmental issues for NKU students. Students were asked to complete a survey collecting demographic information, as well as views on environmental issues, impact of environmental issues on minority groups, and if they have been disproportionately impacted by environmental issues. The survey was distributed via flyers and student newsletters. The results will be analyzed using a Kendall-Tau correlation matrix to identify significant correlations. The results of this project can be used to make NKU a more inclusive institution by tackling NKU students' most pressing environmental issues.

Intentional Pathway Planning Moving Past Succession Planning in Era Post-COVID

Jennifer Ryan and Kate Neack
Business Administration
Management
Business

Faculty Sponsor: Joan Adkins

Abstract: Prior to and during the COVID pandemic, succession planning has been an effective method for training leaders to replace leaving or retiring leaders in an organization. However, research has shown that gaps in the succession planning process meant that employers have not been able to meet their needs in the post-COVID era. Employers replace a leader by finding an individual who fits the position's requirements and grooming that employee to fit the role. Replacing these leaders plays an essential role in aiding the company to maintain its competitive advantage in all industries in both the private and public sectors. Training leaders requires employers to adapt and create new training plans to remain competitive and retain employees in today's industries. This research will show how intentional pathway planning is a better fit for businesses of all sizes as it provides the company with a holistic view to find a better match for the company.

"I Love You, Now Die": The Commonwealth vs. Michelle Carter

Joanna Swaiss
Political Science and Public Relations
School of Communication and Media
Informatics

Faculty Sponsor: Stacie Jankowski

Abstract: In what is now infamously known as the "texting suicide" case, Michelle Carter was convicted of involuntary manslaughter for the death of Conrad Roy. Via text messages and a phone call, she encouraged her then-boyfriend to kill himself. Was justice served? Or was the conviction a violation of Carter's First Amendment rights? My presentation will examine the facts of Commonwealth vs. Michelle Carter and attempt to answer the following questions: Is telling someone to kill themselves protected under the First Amendment? Did Carter's actions constitute manslaughter? This presentation examines arguments both for and against Carter's conviction. I conclude that Carter's speech should not be protected under the First Amendment because it created a risk of physical harm to another human being. As with all cases, considering context is essential to a proper evaluation. However, "wanton endangerment" may have been a more appropriate charge than "involuntary manslaughter". Furthermore, although Carter was tried as an adult (she was 17 when Conrad died), certain mitigating factors support the assertion that she should have been tried as a juvenile. This unique, tragic case has broader implications for what the First Amendment protects.

Loser Table Music Video

Latonya Vires
Electronic Media & Broadcasting
School of Communication and Media
Informatics

Faculty Sponsor: Tracy Songer

Abstract: In my Independent Study, I directed and edited three music videos, one of which was "Loser Table" by a local band and NKU alumni, Computersad. This music video follows the titular loser on a night out, feeling lonelier than ever even though he's surrounded by his peers, desperate for a meaningful experience.

Gaps In Human Trafficking Curriculum on University Campuses

Sheri Frey
Social Work
School of Social Work
Health and Human Services

Faculty Sponsor: Suk-hee Kim

Abstract: Even though human trafficking is receiving more attention than ever before, the number of people becoming victims continues to grow worldwide. In the United States, it is a problem in every state and is not limited to any race, gender, or socioeconomic class. Research shows that higher education is uniquely positioned to help fight against this global problem through teaching and prevention efforts. This research study examined the relevant literature to identify and analyze the preexisting human trafficking curriculums to determine gaps where the current needs for teaching and prevention are lacking on university campuses in the United States.

Accounting for the lack of CPA's: A Review of the Literature on the Shortage of Accounting Students and Certified Public Accountants

Madeline Eisenmann
Accounting
Accounting, Economics and Finance
Business

Faculty Sponsor: Erin Masters

Abstract: In the past decade accounting firms and regulators have expressed rising concern for the number of accounting s pursuing the CPA exam. This paper focuses on the potential deterrents to pursuing CPA licensure. Specifically, this literature review examines the increase in credit hours requirements, starting salary discrepancies, a diminishing number of accounting degree s, and other factors. Peer reviewed studies, practitioner articles, and publications from regulatory agencies and CPA organizations are reviewed and examined to present the perspectives of multiple stakeholders. This research is useful for current and potential accounting students, educators, employers, and other stakeholders in the accounting profession.

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