NKU NORTHERN KENTUCKY UNIVERSITY

CELEBRATION

OF STUDENT RESEARCH AND CREATIVITY

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LETTER FROM THE PRESIDENT

To Our Celebration 2024 Participants and Guests:

Welcome to Northern Kentucky University's annual Celebration of Student Research and Creativity. Congratulations to the students and faculty mentors who are participating this year and thank you to the guests and visitors joining us today.

This is our 22nd year celebrating outstanding undergraduate and graduate research and creativity at NKU. We are very proud of our scholars and our creatives, and it is a joy to showcase their incredible work.

The students featured here have applied classroom instruction and their knowledge and passion to these projects. I know they are excited to share them with the campus and community. Active learning like this is important, and it's central to the student-centered mission of our university.

We are also delighted to highlight the dedicated faculty mentors who have been instrumental in the development of these projects, working alongside students. They foster creative and intellectual skills while helping students strengthen their presentation capabilities. The bonds our faculty build with students are evidence of our core values of excellence, integrity, inclusiveness, innovation, and collegiality.

I hope you will enjoy all the work on display this week because it exemplifies all that our NKU community does for this region as students learn skills and talent for successful careers and impactful lives. Our students are truly special and with our committed faculty's mentorship, they are transforming their communities and the world around them.

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 and impactful.

All my best,

Cady Short-Thompson

Cady Short-Thompson, Ph.D.
President, Northern Kentucky University

LETTER FROM THE PROVOST

Dear Celebration Participants,

Welcome to the Northern Kentucky University 2024 Celebration of Student Research and Creativity!

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

The Celebration of Student Research and Creativity is one platform that allows us to exhibit 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, but the rewards can be tremendous. I know from personal experiences both from my undergraduate research experience with my wonderful NKU professor and later as an NKU research mentor myself, that these experiences can be life-changing for students and the faculty mentors alike!

On behalf of President Short-Thompson and the entire NKU community, I congratulate you on the research, scholarship and creative activity showcased during this annual celebration.

Sincerely,

Diana McGill

Diana McGill
Provost and Executive Vice President for Academic Affairs

WEDNESDAY, APRIL 17, 2024

9 – 10 a.m.
Oral Presentations
SU 109

10 – 11 a.m.
Oral Presentations
SU 109

11 a.m. – 12 p.m.
Oral Presentations
SU 109

12 – 1p.m.
Oral Presentations
SU 109

12:30 – 2:30 p.m.
Poster Presentations
Student Union Ballroom

1 – 2 p.m.
Oral Presentations
SU 109

2:30 – 3:30 p.m.
Nýsa, The NKU Journal of Student Research Volume 6 launch
SU 108

3 – 4 p.m.
Oral Presentations
SU 109

4 – 5 p.m.
Oral and Creative Presentations
SU 109

THURSDAY, APRIL 18, 2024

2 p.m.
College Movie Festival
Digitorium

CREATIVE PERFORMANCES FROM SCHOOL OF THE ARTS

Visit **nku.edu/sota** for tickets and details.

Monday, April 8 // 7 – 8 p.m.
String Area Recital

Tuesday, April 9 // 7 – 8 p.m.
Jazz Combos

Wednesday, April 10 // 7 – 8 p.m.
Woodwind Area Recital

April 11 – 20
The Play That Goes Wrong

April 11 – 26
Spring BFA Senior Exhibitions

Thursday, April 11 // 7 – 8 p.m.
Burdette Studio Recital

Tuesday, April 16 // 7 – 8 p.m.
Jazz Ensemble

Thursday, April 18 // 7 – 8:30 p.m.
Symphonic Winds and Choirs

Monday, April 22 // 7 – 8 p.m.
Steel Band Concert

Tuesday, April 23 // 7 – 8 p.m.
Vocal Jazz

Thursday, April 25 // 7 – 8:30 p.m.
Philharmonic Orchestra

Sunday, April 28 // 7 – 8 p.m.
Percussion Ensemble

ORAL PRESENTATIONS
APRIL 17, 9 – 10 A.M.

The calm before the (next) storm: no third outburst in 2019-2020
Salem Wolsing
Undergraduate
Physics
Physics, Geology and Engineering Technology
Arts and Sciences

Faculty Sponsor: Dirk Grupe

This project 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.

Genomic Analysis of Five Antibiotic Resistant Bacteria isolated from the Ohio and Licking Rivers
Elisha Redman
Undergraduate
Biology and Secondary Education
Biological Sciences
Arts and Sciences

Faculty Sponsor: Joshua Cooper

Abstract: Globally, the microorganisms that cause human diseases are becoming more resistant to antibiotics. Antimicrobial compounds in treated wastewater effluent do not destroy antibiotic-resistant bacteria and their genes, therefore prolonged exposure to them increases resistance. We isolated 94 antibiotic-resistant bacteria that are not known to be human pathogens from the Ohio and Licking rivers, both downstream and upstream of Combined Sewer Outflows that deliver treated wastewater. In order to fully understand the genetic mechanisms of resistance that pathogenic bacteria could acquire, we sequenced the whole genomes of five antibiotic resistance isolates.

Mental Health Trends in Undergraduates
James Renton
Undergraduate
Music Education
School of the Arts
Arts and Sciences

Faculty Sponsor: Perilou Goddard

Abstract: Mental health is a hot topic among university students, staff, faculty, and administrators today. Research suggests that music majors, when compared to non-music major peers, face higher levels of depression, anxiety, and stress. However, few studies investigate why these trends may be occurring. This project surveys NKU undergraduate students about their emotional well-being, stressors associated with their major, and demographic variables. The goal of this project is to identify factors associated with psychological distress among majors in music and other disciplines and to gather data to inform future research.

ORAL PRESENTATIONS
APRIL 17, 10 – 11 A.M.

What is the history, current state, and future direction of the exercise modalities used in bio astronautics by NASA's Human Counter Measures Program?
Ian Angel
Undergraduate
Kinesiology
School of Kinesiology, Counseling, and Rehabilitative Sciences
Health and Human Services

Faculty Sponsor: Jennifer Kaiser

Abstract: In space, limited lift capacity necessitates miniaturization, energy efficiency, and multifunctionality in devices. Extended time in low or zero gravity causes musculoskeletal, cardiorespiratory, and sensorimotor degradation. Exercise serves as a countermeasure, initially aimed at aiding astronauts in exiting space modules and later to mitigate physiological effects. Early devices included civilian elastic bands and adapted mountain rescue systems. Advanced equipment like the CEVIS cycle ergometer, T2 treadmill, and ARED strength training device have since been developed to counter these effects. However, no single system fully mitigates the challenges of the space environment. Ongoing research at NASA's Glen Research Center focuses on developing better solutions for long-term space travel, including missions to the Moon and Mars.

Long-term variability behavior of the Narrow-Line Seyfert 1 galaxy Fairall 303
Marc Aymeric Adou Bogolo
Undergraduate
Physics and Engineering Physics
Physics, Geology and Engineering Technology
Arts and Sciences

Faculty Sponsor: Dirk Grupe

Abstract: This presentation will look at the longterm X-ray and UV monitoring of the Narrow-Line Seyfert 1 galaxy Fairall 303 with the NASA Neil Gehrels Swift mission. I will report on the discovery of this highly variable Active Galactic Nucleus in a very low X-ray and Ultraviolet flux state in 2023 which has let to Swift follow-up observations. These recent observations have shown that Fairall 303 is becoming brighter again. The presentation will discuss possible scenarios what can explain such a strong variability behavior.

Observations of the Changing-Look AGN RX J0128.1-1848
Alaina Spencer
Undergraduate
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 NASA's Swift observatory in an unusually low X-ray flux state: the galaxy RXJ0128.1-1848. This discovery triggered XMM and NuSTAR observations at the beginning of January 2023. Here we will summarize the preliminary results from our decade-long Swift monitoring of RXJ0128.1-1848 from 2007 to the most recent one in February 2024, as well as the January 2023 XMM and NuSTAR observations.

ORAL PRESENTATIONS
APRIL 17, 11 A.M. – 12 A.M.

Sports Fan Animosity: The Demographic Characteristics that Contribute to Rivalry
Jonah Krebs
Undergraduate
Economics and Accounting
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: Sports fans exhibit strong positive consumer traits towards teams they favor while notoriously showing brand hatred towards opposing teams, especially rivals. These negative reactions can lead to adverse incidents that are detrimental to a team or league's reputation. Rivalry matchups can lead to increased security, greater expenditures on marketing, increased ticket prices, more merchandise sales, and higher team identification among fans. This study examines the demographic characteristics, particularly age, that influence a fan's negative reactions towards rival teams through regression analysis using data from the Know Rivalry project. Analysis, results, and conclusions are not yet available.

The Effects of Rising Average Age on Sports Consumption and Time Use
Tyler Canup
Undergraduate
Economics
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: As the average age around the world is on a steady incline, the main mode of consumption for sports seems to be ambiguous. Consumer patterns have been observed to have significant changes as the population is aging. My hypothesis is that as the population ages, sports will be consumed through TV more than in person. I present results from the 2017 and 2022 American Time Use Survey. I will experiment with a correlation matrix, regressions, and post regression tests to manipulate the data and answer the hypothesis.

Fertility and the Future: The Impact of Declining Birthrates on American Innovation
Grace McConn
Undergraduate
Economics & Marketing
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: This paper investigates the impact of declining birth rates on innovation and entrepreneurship in the United States. Drawing on empirical research and analysis, I explore how decreasing birth rates may affect the creation of new, innovative ideas that spur economic growth. The study employs descriptive statistics, trend analysis, correlation matrices, and two multivariate regression models that examine the relationship between birth rates and key variables related to innovation and entrepreneurship: the number of patent grants and new businesses formed each year. My findings, if supportive of my hypothesis, will indicate that as birth rates decline, both innovation and entrepreneurship will decline.

ORAL PRESENTATIONS
APRIL 17, 12 – 1 P.M.

Direct Synthesis and Characterization of 3-phenylpropyl pentanoate
Manav Pradhan
Undergraduate
Biological Sciences
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Our research focuses on synthesizing a crucial organic ester compound, 3-phenylpropyl pentanoate(E12-J55), following the principles of green chemistry. The method overcomes the challenges associated with traditional methods, resulting in greater yields with minimum waste. This solvent-free esterification involves 3-phenylpropane(E12) and pentanoic anhydride(J55) as key reagents in equal mole ratios, conducted at 100°C for about an hour. E12-J55 has significant industrial applications, including producing fragrance and flavorings. It has also shown promising results in treating cancer, highlighting the importance of more studies being conducted on it.

Uploading ethogram data using Optical Character Recognition
Connor Perry, Dimitrios Stathis and Evie Blanchet
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsors: Junxiu Zhou and Christine Curran

Abstract: Writing is a common occurrence, but if you want to copy that writing to the computer it is very time-consuming and often can include errors. Looking in a laboratory setting, behavior tests are often written down then uploaded later, ethograms are a major offender of this. Specifically, in this project, the ethogram file will be preprocessed to isolate or segment characters using OpenCV, then, we will conduct text recognition on the segmented characters using Optical Character Recognition, specifically PyTesseract, finally, the recognized characters will be written to a text file.

Comparison of techniques for wetland amphibian rapid assessments
Alexandra Walsh, Regan Mckinley and Sydney Thomas
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Rapid assessments are used to quickly assess populations in an environment. For wetland amphibians, this usually means figuring out the species' richness or abundance of the amphibians at that location. Many organizations can utilize these to understand the current amphibian population in a short amount of time. Multiple methods can be used to sample amphibians. A variety of these techniques have been employed, including the one outlined by the Ohio Environmental Protection Agency. By comparing the species richness and abundance measured by the different techniques, this study seeks to identify which ones are more effective for wetland amphibian rapid assessments.

ORAL PRESENTATIONS
APRIL 17, 1 – 2 P.M.

Aging & Investing: Does your money get fun over time?
Drew Fouts
Undergraduate
Finance & Economics
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: Lives change over time. Young people start their retirement accounts and investment portfolios; older people start to buy their second, third, fourth homes and convertibles. Making this generalization how does investment change as people get older? Comparing the difference between financial product investments (stocks, bonds, IRAs, etc.) to our 'fun' recreational assets with age will show if our money will actually turn into fun as we age. The analysis and conclusion are still in progress.

Impact of FAFSA mandates on FAFSA applications and college enrollment
Olivia Long
Undergraduate
Economics
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: The Free Application for Federal Student Aid (FAFSA) is a free college financial aid application that is completed by students in their senior year of high school. This research focus is if requiring FAFSA to be completed was effective in increasing FAFSA applications and college enrollments. This was done through an empirical study that included graphing data, creating a correlation matrix and then running a regression to analyze the data. Initial findings show that requiring FAFSA completion does increase total FAFSA applications.

Investigating the Impact of Increased Retirement Age on Consumer Spending Patterns Among Individuals varying Age focusing on retirement
Brandon Ponomarew
Undergraduate
Finance and Economics
Accounting, Economics and Finance
Business

Faculty Sponsor: Linda Dynan

Abstract: This presentation looks at how changes to the retirement age impact consumer expenditure of those over 50. It uses regression analysis and descriptive statistics on datasets from the Federal Reserve and US Bureau of Labor Statistics as well as other sources, drawing on a variety of research sources. Understanding spending trends is aided by visual representations. Regression equations take into account factors including age, wealth, retirement status, income, and food and transportation expenditure percentages. This analysis provides researchers and policymakers with insights into the intricate interaction between changes in retirement age and elder population consumer behavior, influencing future trends and policy choices.

ORAL PRESENTATIONS
APRIL 17, 3 – 4 P.M.

The Culture of DIY Punk: Assessing Ideals, Community, and Changes
Jordan Griffin
Undergraduate
Business Information Systems
School of Computing and Analytics
Informatics

Faculty Sponsor: Brian Hackett

Abstract: DIY (do-it-yourself) punk music has seen a steady change in identity, values, and beliefs since its inception in the 1970s. Although early DIY punk music has been well-documented, much of the scene occurring currently is not being recognized enough. Through research of prior punk bands along with interviews of current musicians locally, the values of musicians have changed from rebellion, anti-establishment, and anarchy to beliefs of kindness, acceptance, and community. By analyzing these changes, people can understand their local music scene better and take productive action in their communities.

Leaving the nest: Age related development of grooming relationships of juvenile olive baboons (Papio anubis) at the Uaso Ngiro Baboon Project in Laikipia, Kenya
Ansley Cahill and Marissa Vestal
Undergraduate
Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Monica Wakefield

Abstract: The juvenile period in primates is an important time for individuals to develop social relationships beyond the maternal unit (mother and sibling). In olive baboons females stay in their natal group while males often transfer out as subadults, thus relationships with unrelated groupmates should be more important for females to develop than males. We tested this by using data on wild juvenile olive baboons and split grooming data into two age groups per sex. GLMM and Cross-sectional analysis supported our hypothesis - female juveniles groom more than males and they increase grooming with unrelated partners as they age.

Computational Data Analysis of Various Tropinone Species
Connor Rhodes
Undergraduate
Chemistry
Arts and Sciences

Faculty Sponsor: Patrick Hare

Abstract: Computational chemistry results for various tropinones were studied and are presented here. The relative energy differences between cis and trans isomers of each tropinone (synthesized by 311LS students in a CURE) were investigated by CHE 362L students using computational methods. Minima and energy differences of each tropinone were determined. Nine of the tropinones exhibit one minimum conformation; seven have minima in more than one conformation. No clear relationship between substituent molecular weight and energy differences of conformers was observed. Hydroxyl-containing tropinones all experienced energy minima in the A1 conformation. C8H6N substituent-containing tropinones all favored “up” conformations.

ORAL AND CREATIVE PRESENTATIONS
APRIL 17, 4 – 5 P.M.

Emily's Envelope Embroidery
Kati Elliott
Graduate Student
English
Arts and Sciences

Faculty Sponsor: Robert Wallace

Abstract: Emily Dickinson's poetry has often been perceived as difficult to interpret due to its obscure, unconventional nature. To appeal to a broader audience regarding the mystifying components of Dickinson poetry, I created a delivery method in the form of visual art. I was able to familiarize myself with her poems and synthesized four of them with an art medium growing in popularity: hand-embroidery. I crafted a piece of hand-embroidery which showcases four chosen poems in pictorial form. By using this element of textile art, I am able to better engage visual learners with Dickinson poetry.

Determining the role of the tRNA methyltransferase Trm7:Trm734 in repression of transposable elements in yeast
Natalie Creech
Undergraduate
Biochemistry
Chemistry
Arts and Sciences

Faculty Sponsors: Michael Guy and Holly Funk

Abstract: Post-transcriptional tRNA modifications are vital for efficient protein translation. In yeast, the Trm7 methyltransferase, with Trm734, modifies tRNAPhe at position 34. Human TRM7 defects are linked to cognitive impairment. Trm734 has been implicated in other cellular processes, like repression of retrotransposition, but the mechanism is unknown. We propose that Trm7 or Trm734 loss heightens the transposition of transposable element TY1 due to impaired translation of Phe-rich genes that limit TY1 mobility. We are conducting experiments to determine if our hypothesis is correct and anticipate reduced levels of Phe-rich TY1-associated proteins in mutants lacking Trm7 or Trm734.

Entangled: The Intersection of Art and Mathematics
Blake Settle
Undergraduate
FYRE student, Mathematics
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Lisa Holden

Abstract: This collection of paintings merges the seemingly unrelated worlds of mathematics and art, with the inner complexity and abstract ideas illustrating their deep connection. The underlying geometric images involve fractals, shapes in which patterns repeat at increasingly small scales. The particular fractal patterns used to create the geometric images were discovered by Dr. Steven Wilkinson and are variations of the Sierpinski triangle and n-Flake Fractals. To create the paintings, the abstract geometric images were first printed on canvas and then painted with acrylics to illustrate the bond between mathematics and art.

POSTERS
12:30 – 2:30 P.M.

1. Memory and Prompter Presence: Investigating the Impact of Prompter Presence on Memory Retention in Educational Settings
Allison Isaacs
Undergraduate
Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Kathleen Fuegen

Abstract: The transition to asynchronous learning during the pandemic has changed the traditional prompter-centric learning model. This study investigated the impact of prompter (instructor) presence on memory retention in learning environments. Participants were randomly assigned to prompter-present or prompter-absent groups, where they would watch a 5-minute video followed by a survey and a multiple-choice test. Results from a t-test showed no significant difference in test scores between groups (p =.06). However, correlation analyses revealed positive associations between test confidence, attention, and scores. This study highlights factors that influence asynchronous learning success, underscoring the imperative for continued research.

2. Visitors to the Great Smokey Mountain Visitor Center
Grace Pfanstiel
Undergraduate
Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Hongmei Wang

Abstract: The Great Smoky Mountain Heritage Center (GSMHC) is a nonprofit in Tennessee, that needed to know where to reach potential customers in USA. The goal of this project was create a map for GSMHC's needs. The choropleth mapping technique is used to display each county's population density. The proportional symbol mapping technique is used to display the total visitors in each county. The final map showcases that the GSHMC currently services a large local community in Tennessee and a sparse western population traveling for the Natural Parks Experience. The GSMHC now can better target advertising on other areas.

3. Urban Expansion in the Greater Cincinnati (Tri-State) Area
Olivia Onodu and Conner Viox
Undergraduate
Environmental Science
Biological Sciences
Arts and Sciences

Faculty Sponsor: Hongmei Wang

Abstract: Urban expansion is influenced by the growing needs of urban environments and increasing population density. The objective of this project is to determine whether the Greater Cincinnati area's urban expansion has accelerated more in the last 10 years compared to the preceding decade. The land cover change during these periods is examined using the Landsat 4–9 satellite images. The results support a favorable response to the research question. The results of this study may assist local authorities in determining which rural and natural areas are most in need of environmental protection.

4. Galactic Cosmic Ray Propagation Studies
Sharyl McKeever
Undergraduate
Physics
Physics, Geology and Engineering Technology
Arts and Sciences

Faculty Sponsor: Scott Nutter

Abstract: Galactic cosmic ray (GCR) propagation models, which model transport from GCR source to Earth as diffusion, depend on several parameters. Parameter values are adjusted to fit key GCR ratios. For example, 10Be/9Be is a key isotopic ratio constraining time of propagation, while B/C constrains distance of propagation. With sufficient data in the 1-10 GeV/n energy range, these two ratios should determine the GCR diffusion zone half-width, L. There is currently a lack of mid-high energy, mass-resolved data for the Be isotopes, which is needed to determine L. The High Energy Light Isotope eXperiment (HELIX) balloon is set to launch this spring, and is equipped with instruments capable of resolving Be isotope masses within the needed energy range. This work explores model "maps" of varying L values, onto which the anticipated data can be easily graphed for analysis and determination of the best fit L parameter.

5. Potential of Natural Lifestyle Interventions to Improve Quality of Life and Overall Health in People with Chronic Pulmonary Disease

William Sandlin
Undergraduate
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Jackie Davis

Abstract: This is a review of literature regarding the health effects of natural lifestyle interventions such as breath work techniques, regular exercise, and nasal breathing. The purpose of this review is to evaluate the potential health and quality of life benefits that chronic pulmonary patients may receive from incorporating these practices into their lifestyle. The review of the literature revealed that these practices can benefit a person's health in a multitude of ways, including aspects of both physical and mental health. The potential for future research in these areas is also discussed.

6. Extracorporeal Membrane Oxygenation (ECMO); A Review of Literature

Kiley Hobbs, Hunter Pittman and Sophia Sodano
Undergraduate
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Jackie Davis

Abstract: Extracorporeal membrane oxygenation (ECMO) is a form of life support and a therapeutic approach that provides temporary aid to patients experiencing severe pulmonary and/or cardiac failure. Venous-Venous ECMO is the preferred method for respiratory failure, while Venous-Arterial ECMO is recommended for cardiac support. Many studies have examined the use of ECMO in different cardiac and pulmonary disease processes. The purpose of this literature review is to summarize findings of these studies, present the evidence supporting ECMO as a treatment option for critically ill patients, and practical aspects of implementing ECMO.

7. Conceptual Art and the Beliefs of the Viewer

Finley Smith
Undergraduate
FYRE student, Visual Communication Design
School of the Arts
Arts and Sciences

Faculty Sponsor: Kimberly Allen-Kattus

Abstract: Conceptual art, stemming from the avant-garde, requires the viewer to open their mind to abstract ideas as an art form. It is no coincidence that those who resonate the most with it are often the liberal and open minded. If art marginalizes its audience, however, then it will fail to reach and influence anyone but those who already agree with its underlying message. To understand how conceptual art may broaden its audience and influence, we must examine the ideas from which the movement stems. The average viewer must recognize that conceptual art demands their own participation, mentally or physically.

8. An Analysis of a Shrinking Lake Mead

Rosemary Bryant
Undergraduate
Geology
Physics, Geology and Engineering Technology
Arts and Sciences

Zachary Shreves
Undergraduate
Environmental Science
Biological Sciences
Arts and Sciences

Faculty Sponsor: Hongmei Wang

Abstract: The Lake Mead Reservoir provides water for municipal, industrial, and agricultural use in local communities. Lake Mead's water levels have changed significantly over the last 16 years. Landsat 4-9 satellite images are used to analyze the Reservoir water level change with the use of the ENVI software. Due to a decrease in the water level, there has been significant change to the type of land cover in the surrounding area. The results of this project can help local governments prepare for the effects followed by the decrease in Lake Mead's water level.

9. Unwind at work: A literature review exploring burnout in healthcare.
Alaisha Jenkins, Kin Adan and Taneya Burney
Undergraduate
Respiratory
School of Allied Health
Health and Human Services

Faculty Sponsor: Jackie Davis

Abstract: In healthcare, burnout has been a growing issue. It not only affects the well-being of healthcare professionals but can have negative effects on patient care. This problem must be addressed to ensure the delivery of high-quality care and maintain a sustainable work environment in healthcare. To make progress on this problem it is important to identify contributing factors such as heavy workload, lack of control, and inadequate support system. This project will review available literature to understand the causes and consequences of employee burnout in the healthcare setting.

10. Evaluation of a possible treatment for restoring executive function after prenatal morphine exposure
Bolaji Akindiose
Undergraduate
FYRE student, Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: We previously found that prenatal morphine use has an adverse effect on executive function, especially in male offspring. This study seeks to determine if macrophage colony-stimulating factor (mCSF) administration would reverse the effect of morphine (MO) on the executive function of the offspring using a mouse model. Offspring from MO or saccharine prenatal exposure group were randomly placed into a control treatment or mCSF treatment during the developmental window for executive function. We found no effect of MO or mCSF on motivation but plan to assess attention and impulse control, types of executive functions more affected by opioid exposure.

11. Patient and Therapist Adoption Criteria for Mental Health Applications
Olivia Kennedy
Undergraduate
Pre-med biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Nicholas Caporusso

Abstract: As demand has risen, mental health care is at a continuous service gap, due to cost, accessibility, and stigma. Mental health applications have become a potential solution to these issues; however, their quality and effectiveness vary. Assessing what qualities are essential to proper care from a therapist and patient perspective can help improve this mobile health technology. Findings show an effective patient experience involves reliability of information, availability of treatment, and privacy concerns. From a therapist's perspective, relevant topics included validated screening measures, data analysis, positive reduction in workload, communication with patients, and adoption of therapeutic alliance principles.

12. Analyzing Human Dynamics through an Extensive Auction Dataset
Aaditya Khanal
Undergraduate
Data Science
School of Computing and Analytics
Informatics

Faculty Sponsors: Nicholas Caporusso and Alina Campan

Abstract: Auctions provide a unique lens through which human behavior can be studied, particularly in the realms of decision-making, strategy, and economic interaction. The data generated in auction environments, characterized by competitive bidding, time constraints, and varying levels of information asymmetry, offers rich insights into how individuals make decisions under pressure, uncertainty, and scarcity. Researchers can gain a deeper understanding of cognitive biases and strategic decision-making in competitive environments by analyzing bid increments, winning bids, and participant behavior across various auction types. In this paper, we present the results of a preliminary study that focused on the dataset from a popular online auction website where users can bid on different types of retail products. Our findings report three auction behaviors and human dynamics discovered in the dataset.

13. Effects of electronic-cigarette use on the respiratory system.

Tessa Gross
Undergraduate
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Jackie Davis

Abstract: Despite being created as an alternative to cigarettes, electronic cigarettes (e-cigarettes) or vaping have numerous harmful effects on the respiratory system. In 2019, there was an E-cigarette outbreak, or vaping product use-associated lung injury (EVALI), increasing awareness of the harm of using vapes. Respiratory illnesses have been linked to vaping, such as bronchiolitis obliterans, asthma, and COPD. The purpose of this literature review is to analyze the effects of E-Cigarettes and vaping on the respiratory system.

14. To stay or to go: juvenile social relationships predict future fission in wild olive baboons (Papio anubis) at the Uaso Ngiro Baboon Project, Laikipia, Kenya.

Marissa Vestal and Ansley Cahill
Undergraduate
Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Monica Wakefield

Abstract: We examined juvenile social networks via grooming to explore the impact of a troop fission. Specifically, do grooming networks predict the lines of fission, or does the fission change juvenile social networks as the new subgroup develops? Results showed that juveniles already developed concentrated grooming networks a year prior the troop beginning the process of spatial fission. Meaning they socially fissioned prior to spatially. As network analyses often exclude juveniles, our results contribute to a broader understanding of social dynamics during group fission. These data also contribute to understanding of the expansion and concentration of social networks during troop fission.

15. Who's your BFF? Exploring the dyadic relationships between juvenile olive baboons (Papio anubis)

Jay Utz, Grace Pfanstiel, and Ashley Adams
Undergraduate
Criminal Justice & Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Monica Wakefield

Abstract: Social grooming in primates is an important indicator of strength of social bonds. Among adult olive baboons, there are distinct sex differences in grooming partner preferences. We tested if these grooming relationships are discernible in the juvenile period and if there are age/sex differences in partner preferences. Using data collected from the UNBP, we extracted all grooming situations involving juveniles and calculated a grooming index for each dyad in the sample. We found that age and sex significantly influenced the number of grooming partners among juveniles, suggesting that the juvenile period is a critical time for developing longterm relationships

16. Sex differences in juvenile grooming: validation of methods of wild olive baboons (Papio anubis) at the Uaso Ngiro Baboon Project in Laikipia, Kenya

Ansley Cahill and Marissa Vestal
Undergraduate
Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Monica Wakefield

Abstract: Social grooming in olive baboons is important for social bonding, but there are distinct sex differences in adult grooming. We explore the development of grooming relationships by examining juvenile grooming patterns. Female juveniles invested more in grooming than males - grooming more often, longer, and giving more than receiving. Both sexes groomed more with other juveniles than any other group suggesting that they are developing potential longterm relationships among their cohort. These results mirror adult sex differences in grooming and provides support that the juvenile period is important for establishing and developing the social bonds between male and female baboons.

17. Blink Detection Algorithm Based on Facial Geometry

Elaina Hall and Tyler Egloff
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Nicholas Caporusso

Abstract: This paper presents a novel approach for real-time blink detection leveraging facial geometry. We present three algorithms-eyelid distance, the shoelace theorem, and polygonal triangulation-utilizing three-dimensional landmarks of the eye and pupil for measuring eyelid openness. Our research addresses the challenges blinks pose to eye-tracking in areas such as cognitive studies and human-computer interaction. The comparative analysis of these algorithms demonstrates their utility in enhancing the accuracy and efficiency of eye-tracking applications.

18. Differing Effects of Physical Activity on Psychopathology of Females & Males

Faith McNamara
Undergraduate
FYRE student, Biology
Biological Sciences
Arts and Sciences

Faculty Sponsors: Ty Brumback and Heather Kissel

Abstract: Individuals who participate in physical activity (PA) tend to have less symptoms of mental illnesses. Using a structured clinical interview and self-reported PA, we examined the correlations between different forms of PA and psychopathological symptom counts in a sample of 124 young adults (69.4% female, mean age=20.44). High intensity PA or weight training was significantly related to reduced depression symptoms. Participating in an hour of PA was significantly related to fewer panic disorder symptoms. The relationship between PA and psychopathology symptoms differed by sex. Males generally showed more significant reductions in symptoms related to PA than females.

19. Synthesis of Heteroaryl Compounds as Aromatase Inhibitors

Kennedy James
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Heteroaryl compounds were synthesized from a methyl ketone and an aryl halide using palladium catalyst. Synthesis involved adding the following reagents: Ketone, heteroaryl halide, pd catalyst, tBuOna, and degassed toluene to a vial in a glove box. Microwaving the vial started the reaction that was worked up to obtain the crude product, which was purified using medium pressure chromatography (MPLC). The pure product was characterized by 1H, 13C NMR and HRMS. Bioassay determined the percent inhibition against aromatase. High percent inhibition across different concentrations of the compound would deem it adequate as a potential drug candidate.

20. Less Invasive Surfactant Administration

Anna Zimmerman, Chloe Lehn and Evan Arana
Undergraduate
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Jackie Davis

Abstract: Surfactant is important because it can prevent chronic lung problems caused by respiratory distress syndrome (RDS) in premature infants. The methods of administering surfactant are the traditional method, less invasive surfactant administration (LISA), and intubate-surfactant-extubate method (InSurE). The purpose of this literature review is to determine if LISA and InSurE are more effective than the traditional technique and it is answered through analyzing literature. The results will theoretically be LISA due to a decreased chance of infection and patients do not require intubation for the procedure.

21. What is Pulmonary Alveolar Proteinosis and what interventions are done to treat it?

Kathryn Alvidrez and Jharana Rai
Undergraduate
Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsor: Jackie Davis

Abstract: Pulmonary Alveolar Proteinosis (PAP) is a rare lung disorder marked by abnormal accumulation of surfactant proteins and lipids in alveoli. This accumulation leads to impaired gas exchange and respiratory function. Understanding PAP is crucial for respiratory therapists since they are involved with diagnosing and treating respiratory disorders. The purpose of this literature review is to educate healthcare providers and the public on PAP and compare the treatment options for this disease. Literature suggests whole lung lavage and inhaled GM-CSF yield the best outcomes. Further research is necessary for enhanced understanding and development of targeted therapies.

22. An Approach to Albuterol Protocol Development Based On Disease Process in Neonatal Intensive Care Units (NICU)

Lauryn Hicks, Jaila Frye and Mallory Hill
Undergraduate
BS in Respiratory Care
School of Allied Health
Health and Human Services

Faculty Sponsors: Jackie Davis and Alicia Ireton

Abstract: Albuterol, a respiratory medication that is classified as a bronchodilator, allows for easier breathing. Tri-state area hospitals who may administer albuterol to neonatal patients do not currently have a protocol to do so in the Neonatal Intensive Care Unit (NICU). The purpose of this literature review is to establish indications for the administration of albuterol in the neonatal population as well as disease processes that may benefit from albuterol. Contraindications and side effects of albuterol administration will also be discussed. Using the findings from this literature review, an albuterol administration protocol will then be developed.

23. Determination of Anion Gap using Pulsed Chronopotentiometry

Olivia Neal
Undergraduate
Chemistry
Arts and Sciences

Faculty Sponsor: Kebede Gemene

Abstract: Determination of anion gap (AG) is very important for the diagnosis of many diseases. AG is measured to test for acid-base imbalance or blood electrolyte imbalance. AG is calculated from the separate measurement of different electrolytes and is prone to error. We present here a simple and rapid method for the determination of AG by simultaneous measurement of cations and anions using pulsed chronopotentiometry. This method was utilized to measure AG in artificial blood and gave promising results. This presentation features results from the measurement of AG in blood plasma to demonstrate the utility of this method for clinical applications.

24. Locomotor activity in female and male rats after acute oxycodone

Aaliyah Harrell, Isabella Carr, Anna Rey Caldera, and Morgan Goepper
Undergraduate
Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Mark Bardgett

Abstract: Oxycodone is a powerful prescription opioid that possesses high liability for abuse. Studies of oxycodone in rats have focused on the effects of repeated administration in tests of conditioned place preference or drug self-administration. Thirty-two female and male rats were tested for locomotion after receiving an injection of saline or oxycodone at one of three doses: 0.3, 1.0 and 3.0 mg/kg. Oxycodone had dose-divergent effects on locomotor activity with the two lower doses elevating activity and the high dose decreasing activity. Locomotor responses to acute oxycodone may serve as a quick and useful assay of factors influencing oxycodone sensitivity.

25. A Tale of Two States: Abortion Referenda in the Aftermath of Dobbs

Tanner Freeman and Ainsley Boggs
Undergraduate
Political Science & History
Political Science, Criminal Justice and Organizational Leadership
Arts and Sciences

Faculty Sponsor: Shauna Reilly

Abstract: The overturning of Roe v Wade challenged the perception of abortion across the United States; some states opted for total bans, while others continued to permit abortions. This project explores the dueling referenda of 2022 and 2023 in Kentucky and Ohio, respectively, following the Dobbs decision in 2022. Using case studies, we examine the political nuances and electoral aftermath of these referenda, and find a dichotomy behind how electoral decisions have influenced policy at the state level. While voters supported abortion access and rights in both referenda, the states vary in their continued legality of abortion.

26. Methyl Ketone Heteroarylation Synthesis and Aromatase Inhibition Assay

Kendra Baker, Kalyn Koons, and Thu Nguyen
Undergraduate
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: In this study, compounds I61-H37, I60-G67, and I74-G18 were synthesized using a microwave-assisted reaction and a palladium catalyst. Once successfully synthesized, compounds were purified using medium-pressure liquid chromatography (MPLC). Among these three compounds I74-G18 provided the best yield of 49.3%. Aromatase inhibition assay was also performed on seven compounds to determine the inhibition on aromatase. I63-H40 had the greatest percent inhibition of 73.8% at a concentration of 10 μM.

27. Direct Thioamidation of ketones Under Microwave Irradiation

Matthew Maines and Anh Nguyen
Undergraduate
Biochemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Thiosemicarbazides and cyclic ketones have been studied for years for their individual medical importance. Thiosemicarbazides have been researched extensively for their multitude of derivatives with varying anti-cancer bioactivities. Cyclic ketones generally are great antinociceptive molecules that are commonly found in opioids and other pain relievers. In this project, various cyclic ketones were studied for their reactivity to form thioamide compounds. The reactions were carried out under microwave irradiation to allow the rapid construction of a library of molecules. The inclusion of tropionen and thioamide feature into one scaffold allows the design of heterocyclic tropinones with potential anti-cancer activities

28. Course-based Undergraduate Research Experiences (CUREs): On the Path to the Synthesis of Tropinone-Thiazole Derivatives

Zoe Robles
Undergraduate
Environmental Science
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Previous research suggests that thiazole derivatives of tropinone have excellent anticancer activity as well as low toxicity to normal cells. Our reaction involved synthesizing thioamide from thiosemicarbazide. Then, tropinone and thiosemicarbazide were reacted to form 2-(8- methyl-8-azabicyclo[3.2.1]octan-3-ylidene) hydrazinecarbothiamide. Both reactions were performed in ethyl alcohol with acetic acid as the catalyst under microwave irradiation at 140? for 20 minutes. This study provides useful information for research regarding the synthesis of tropinone-thiazole derivatives and their potential uses in combating breast cancer.

29. Comparisons of Ion Cross-Sections
Juan Calderon
Undergraduate
Physics
Physics, Geology and Engineering Technology
Arts and Sciences

Faculty Sponsor: Scott Nutter

Abstract: GEANT4 is a particle physics software suite used in simulating data for particle physics experiments, including for cosmic ray detectors. Data simulated with GEANT4 are used to interpret cosmic-ray measurements from balloon-borne and International Space Station experiments. We have extracted interaction rates (cross sections) of a projectile nucleus on a target nucleus as predicted by GEANT4 using multiple interaction models and compared them to measurements. We have also examined the difference in predictions when switching target and projectile. We explored the range of energies from 200 MeV/nuc to 50 GeV/nuc.

30. Undergraduate Research in Organic Chemistry Course (UROCC): Teaching Assistants
Kendra Baker
Undergraduate
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Course-Based Undergraduate Research Experiences (CURE) labs allow students to think critically about the science behind experiments and problem solve as opposed to following the step-by-step guides often provided. At Northern Kentucky University (NKU), a Undergraduate Research in Organic Chemistry Course (UROCC) following the CURE curriculum was implemented. Students are guided to conduct original research and make discoveries on potential aromatase inhibitors to help treat breast cancer. Teaching assistants have been involved to assist with special organic chemistry lab techniques and instrument operation to ensure all students had timely access to the resources necessary for success.

31. Course-based Undergraduate Research Experiences (CUREs): Environmentally Friendly Esterification of Alcohol with Acid Chloride
Kalkidan Alemu and Jessica Bryndal
Undergraduate
Biological Sciences
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: This study focuses on the green chemistry approach for the synthesis of esters from alcohols and acid chlorides. The unique reactivity and wide availability of the starting materials make them ideal building blocks for the discovery of bioactive molecules. The reactions were carried out in a microscale and solventless condition for a better understanding of cost-effective and environmentally friendly reactions aligning with green chemistry principles. IR and NMR were used to monitor the reaction progress and characterize the final product. Our research findings on the esterification process help to comprehend its various applications, ranging from pharmaceutical drugs to industrial products.

32. Course-based Undergraduate Research Experiences (CUREs): 1-Cycloheptylidenethourea and 2-Cycloheptylidenehydrazinecarbothioamide Synthesis
Anh Nguyen and Matthew Maines
Undergraduate
Biochemistry and Biology
Chemistry and Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Heteroaryl compounds play a crucial role in the pharmaceutical field and have the potential to act as inhibitors for the aromatase enzyme, thereby aiding in the fight against cancer. The thiamide reaction, a crucial intermediate step, facilitates the formation of the thiazole ring, a key structural component of the target molecule. This presentation detailed our study on the synthesis of two thiamide compounds. Various parameters, including temperature, solvent, reaction time, and the nature of the substrates, were systematically evaluated to maximize the yield and selectivity of the desired product. This methodology allowed for the efficient synthesis of I17-M21 and I17-M22, demonstrating promising prospects in the development of aromatase inhibitors for cancer treatment.

33. Prenatal Opioid Exposure and the Orbitofrontal Cortex

Patrick Murphy
Undergraduate
Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: Prenatal opioid exposure has been associated with cognitive and behavioral problems in offspring. This prompts research on opioid treatment options during pregnancy. One such treatment buprenorphine (BUP), which decreases withdrawal symptoms. But what effects does this have on offspring? Our study is using a mouse model to look at the effect BUP has on cellular development of offspring brains exposed to BUP, compared to mice exposed to saline or morphine (a metabolite of heroin). We are quantifying the effect the different treatments have on perineuronal nets, microglial cells, and parvalbumin cells in the frontal and orbitofrontal cortices of the brain.

34. Course-based Undergraduate Research Experiences (CUREs): Esterification of E7-O5 in Solvent-free Conditions

Jessica Bryndal
Undergraduate
Biological Sciences
Chemistry
Arts and Sciences

Kalkidan Alemu
Undergraduate
Biological Sciences
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Esterification is a widely used organic transformation that allows for the construction of an ester group which appears in many drug and prodrug molecules. The purpose of this project is to create and characterize potential bioactive molecules resulting from the reaction between alcohols and acid chlorides. This reaction was performed in solvent free conditions at room temperature followed by IR and NMR to monitor and identify the compound. This project will provide useful knowledge for the potential treatments for breast cancer. The results will also provide a foundation for future Course-based Undergraduate Research Experiences (CURE) lab design.

35. Undergraduate research in organic chemistry course (UROCC): Synthesis and Characterization of Thiosemicarbazide Compounds and its Green Chemistry Potential.

Josh Stinson
Undergraduate
Biology
Biological Sciences
Health and Human Services

Faculty Sponsor: Lili Ma

Abstract: Thiosemicarbazide compounds are important biomedical compounds used as anticancer agents. Like most reactions used in that realm of science, the reactions are quite metal heavy and produce significant amounts of waste. Reactions such as tropinone and thiosemicarbazide, are used to make compounds that have antiproliferation activity, which is a key component in many anticancer drugs. Unfortunately, this reaction is still commonly run using toxic metals. Our goal is to use the green chemistry principles and carry out the aforementioned reaction metal free and using Irradiation. The products made will be confirmed using NMR and IR instruments.

36. Course-based Undergraduate Research Experiences (CUREs):: Synthesis, Characterization and Physicochemical Property Prediction of Esters

Matthew Dennison
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Esters encompass a wide range of compounds that can be extremely useful in both the medical and chemical industries. Many drugs such as Enalapril and Simvastatin contain an ester in their structure. Several reaction conditions were investigated, and the final optimized conditions were as follows: 1 equiv. alcohol, 1 equiv. anhydride, 5% catalyst, 100 oC, 30min. All the synthesized molecules were explored for their physicochemical properties using ACD Percepta drug discovery software. The ester compounds synthesized haves a potential use for aromatase inhibition. This could be applicable in the medical field for potential chemotherapy use against breast cancer.

37. Course-based Undergraduate Research Experiences (CUREs): Drug-like Property Prediction for Tropinone Derivatives

Kaleigh Masternak
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: ACD Percepta is a drug discovery software used to predict the physicochemical properties of small organic molecules. An ester and tropinone scaffold structure is valuable because the modified tropinone has a Nitrogen atom and a carbonyl group which are used in pharmaceuticals. In this project, Percepta and Lipinski's Rule of Five are used to study the drug-like property of tropinone derivatives. Pairs of undergraduate lab students worked together using different variations of tropinone to synthesize and find an effective molecule to potentially discover an aromatase inhibitor to fight against breast cancer.

38. Show me the Money: The Effect of Interest Groups on Environmental Ballot Measures

Heather Rauch and Shae Wright
Undergraduate
Political Science and FYRE student
Political Science, Criminal Justice and Organizational Leadership
Arts and Sciences

Faculty Sponsor: Shauna Reilly

Abstract: To what extent do interest groups influence the passage of environmental ballot measures? Corporate interests have many venues to influence policy through the legislature. However, citizen law making has made it easier than ever for corporations to directly and indirectly sponsor ballot measures that would impact their ability to operate. This is particularly true in the area of environmental ballot measures. We plan to explore environmental ballot measures from 2013-23 and the role that interest groups have impacted various aspects of environmental ballot measure elections.

39. Course Based Undergraduate Research Experiences (CURE): Synthesis and Characterization of Dibenzylidenecycloheptanone Compounds

Morgan Lopes
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: The Claisen-Schmidt condensation reaction was reported to synthesize tropinone derivatives from tropinone and benzaldehyde, demonstrating promise as potential therapeutic agents due to their selective cytotoxicity. In this study, a novel organic ketone, (2E,7E)-2,7-dibenzylidenecycloheptanone, (I17-D0-I17-ML-A) was formed by reacting cyclopentanone and benzaldehyde. The optimized reaction conditions will be utilized to synthesize tropinone derivatives with various functional groups on the aldehyde moiety. The products were fully characterized by IR, 1H NMR, 13C NMR and DEPT NMR. This reaction contributes essential information to the ongoing research of aromatase inhibitors, by offering insights into discovery and potential therapeutic applications against breast cancer.

40. Exploring neuronal activity and perineuronal nets in prenatal opioid-exposed offspring

Boluwatife Osifalujo
Undergraduate
Neuroscience
Biological Sciences
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: Opioids induce microglia activation (brain immune cells), which could disrupt interactions with perineuronal nets (PNN) on neurons. Prenatal morphine (MO) exposure increases social behavior but impairs offspring's accuracy and attention in mouse model. This study investigates cellular mechanisms involved by randomizing female mice to receive MO or saccharin (control) during pregnancy. Brain tissue was collected from 12-week-old offspring and labeled via immunohistochemistry. We found a higher PNN percentage in the female amygdala in the MO group. We then labeled cFos in the amygdala to evaluate neural activity post-puzzle box and social interaction tests before collecting tissue.

41. Course-based Undergraduate Research Experiences (CUREs): Investigating Electrophile Reactivity for Esterification Reactions
Jorgi Castillo-Perez and Jacob Gildenblatt
Undergraduate
Biological Sciences and Biochemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Acid chloride, acid anhydride, and carboxylic acids play important roles when it comes to the synthesis of anti-cancer agents, which is possible with mechanisms such as the interaction between bioactive molecules and the pharmaceutical target. This study examined a range of reaction conditions, such as carbonyl electrophiles, solvents, catalysts, reaction duration, and temperature. This research study provides valuable information for future research regarding the discovery of novel bioactive molecules as anti-cancer agents, with hope for a step closer to a cancer-free world.

42. Exploring the Impact of Histidine Dipeptides on Growth and Genome Stability in Saccharomyces cerevisiae
Yara Abdou, Amila Coric, and Kailee Kenwright
Undergraduate
FYRE Student, Biological Science
Biological Sciences
Arts and Sciences

Faculty Sponsor: Erin Strome

Abstract: In Saccharomyces cerevisiae, the genes SAM1 and SAM2 regulate the synthesis of AdoMet, an essential methyl donor. Losses of these genes impact genome stability and AdoMet levels. A Phenotypic Microarray tested how different conditions affect the growth of strains lacking SAM1 or SAM2. The resulting data indicated that SAM2 knockout strains grew better in the presence of histidine dipeptides than wildtype. Histidine dipeptides are known antioxidants and metabolites, but which impacted cellular pathways are causing growth differences are unclear. This project investigates how histidine dipeptides interact with specific genes and pathways to explain the observed increased growth of SAM2 knockouts.

43. First-Year Information Literacy Aha Moments
Liam Barker
Undergraduate
FYRE student, Electronic Media and Broadcasting
School of Communication and Media
Informatics

Faculty Sponsor: Andrea Brooks

Abstract: Information literacy is vital for first-year students' success. This research aimed to better understand first-year students' responses to IL ideas. Students were asked to provide an aha moment following an IL library instruction session, and researchers coded the responses to one of the six frames introduced in the ACRL Framework for Information Literacy for Higher Education. Out of nearly 250 responses, Searching as Strategic Exploration and Information has Value were the most reported frames, which included topics like accessing databases and recognizing bias. This information will help librarians create a strong IL foundation for first-year students at NKU.

44. How music affects information retention
Adam Klein
Undergraduate
FYRE student, Education
Education

Faculty Sponsor: Sara Runge

Abstract: A majority of people listen to music while studying. Recent research suggest that music is beneficial when studying. However, other types of music such as lyrical music and loud, fast-paced music can draw people's attention away from studying. I tested the hypothesis that slow paced, quiet music is more beneficial to studying than other types of music. The results proved that music that is softer in tone and slower-paced is more beneficial to information retention; though listening to music that is familiar, can calm people down and allow them to pay more attention when studying.

45. Sex Does Not Influence Oxycodone-Conditioned Place Preference in Rats

Morgan Goepper, Ana Rey Caldera, Isabella Carr, Aaliyah Harrell and Tyler Downnen
Undergraduate
Psychology and Neuroscience
Psychological Science
Arts and Sciences

Faculty Sponsor: Mark Bardgett

Abstract: Past clinical research suggests that some parameters of oxycodone misuse are significantly influenced by gender. We characterized the effects of sex on oxycodone-conditioned place preference (CPP) in rats. Rats were given a subcutaneous injection of either saline or oxycodone at one of three doses: 0.3, 1.0, and 3.0 mg/kg. Rats trained to associate a specific compartment with oxycodone spent more time there when allowed to freely choose between compartments. However, sex did not alter oxycodone CPP, suggesting that it does not dramatically influence preference for drug-associated cues. In future studies, other parameters of oxycodone conditioning should be assessed by sex.

46. Direct UV photodegradation of 6PPD and its hydrolysis product in aqueous solution

Josh Johnson and Connor Rhodes
Undergraduate
Chemistry
Arts and Sciences

Faculty Sponsor: Patrick Hare

Abstract: 6PPDQ, an ozonolysis product of the tire-additive 6PPD has recently been identified as a highly concerning aquatic pollutant. In contrast, 6PPD has received less interest, particularly its photochemistry. Complicating aquatic studies, 6PPD readily hydrolyzes, primarily forming 4-hydroxydiphenylamine. 6PPD was studied in aqueous solutions under direct excitation, both immediately after dissolution and after several days using LC-MS to quantify the photodegradation. Photodegradation in acetonitrile, in which 6PPD is stable, was also carried out. 6PPD photodegrades quickly under UV radiation, while the loss of 4-hydroxydiphenylamine is slower. Small amounts of 6PPDQ are likely produced from direct photodegradation of 6PPD.

47. Progress Toward the Synthesis of Next Generation 1,2,3,-Triazole Analogues As Potential Antimicrobial Agents

Amber Robertson
Undergraduate
Biochemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Amber Onorato

Abstract: IFIs are increasing due to fungi developing drug resistance. Unfortunately, this resistance has not been accompanied by the discovery of new antifungals. The azole class of antifungals has been shown to be less effective, stressing the need to develop new compounds. The goal of this research is to synthesize novel triazole containing molecules with potent antifungal activity. The key synthetic step will involve a click reaction between the alkyne and azide intermediates. Once synthesized, the minimum inhibitory concentrations of these compounds will be determined against fungi associated with life-threatening IFIs.

48. Using Statistical Methods to Build Predictive Screening Tools

Kristoffe Wilson
Undergraduate
Statistics
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Joe Nolan

Abstract: Most hospitals prioritize minimizing readmissions. This poster examines the application of logistic regression to existing, easy-to-obtain, patient records to build models that help identify risk for readmission. Once a model is in place patients deemed to be a higher risk can be targeted with specific interventions to lower that risk. Such models can be applied not only to readmissions but also to risk of the development of various disease conditions.

49. Strategy for Identifying Trm7 Residues Important for Binding Trm732 and Trm734 Using Deep Sequencing

Alex Mullins, Ashton Davey
Undergraduate
Chemistry and Data Science
Chemistry and School of Computing and Analytics
Arts and Sciences and Informatics

Faculty Sponsors: 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 and Trm734. In humans, lack of FTSJ1, the human homolog of Trm7, causes intellectual disability. We have previously identified important regions in Trm7 using a targeted mutagenesis strategy. However, we do not know which Trm7 residues are important for binding to Trm732 or Trm734. We have made a Trm7 variant library to be analyzed in strains lacking either Trm732 or Trm734. Trm7 variants in strains will be deep sequenced to determine defective variants.

50. Survival Analysis to Explore Rate of Reinjury in Sports

Reece Tolliver
Undergraduate
Statistics
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Joseph Nolan

Abstract: Survival analysis is a useful statistical tool that can be applied to rates of reinjury (and/or recovery) in healthcare. In this study, we examine the application of survivorship models to the rate of reinjury for athletes having concussion injuries. Kaplan-Meier curves provide a visual representation of these rates over time. As an extension of these ideas, we also considered changes in the "slope" for the survival curve as a mechanism to compare these rates to expected natural attrition that would occur even without the injury.

51. Analyzing the Potential User Adoption of Video Podcasts for Scholarly Research Dissemination

My Doan, Na Le, and Anh Tran
Undergraduate
Marketing, Visual Communication Design, and Data Science
Marketing, Sports Business and Construction Management, School of the Arts, and School of Computing and Analytics
Business, Arts and Sciences, and Informatics

Faculty Sponsor: Nicholas Caporusso

Abstract: The rise of online platforms has led to video podcasts becoming vital for scholars to connect with the public. This study aims to investigate the role and impact of video research podcasts, focusing on the challenges related to the accessibility and comprehension of scholarly research. A 10-question survey was administered to evaluate the effectiveness and acceptance of video research podcasts. Employing the Unified Theory of Acceptance and Use of Technology model for analysis, results indicate that video research podcasts have the potential to enhance accessibility and understanding of scholarly research. Addressing motivational factors and barriers is essential for wider adoption.

52. Teaching Evaluations: Using Big Data Visualization to Explore Challenges and Opportunities

William Alger and My Doan
Undergraduate
Computer Science and Marketing, Sports Business and Construction Management
School of Computing and Analytics
Informatics and Business

Faculty Sponsor: Nicholas Caporusso

Abstract: Teaching evaluations are commonly used in educational institutions to assess and improve the quality of education. However, they have a large potential for bias due to predefined criteria, lack of transparency, and completion tracking. The authors present the results of a study that explored how data visualization could help teachers and students navigate the challenges and opportunities offered by teaching reviews. The result suggests that integrating historical data visualizations can significantly enhance the informative nature of the review process. This study endorses using visualizations in teaching reviews to provide deeper insights and a more informed perspective for teachers and students.

53. An AI-Driven Therapist for Enhancing Interaction in Individuals
Rita Ghimire, Olivia Kennedy, My Doan, and Oshan Maharjan
Undergraduate
Computer Science, Biological Sciences, and Marketing
School of Computing and Analytics, Biological Sciences, and Marketing, Sports Business and Construction Management
Informatics, Arts and Sciences, and Business

Faculty Sponsor: Nicholas Caporusso

Abstract:
People with disabilities often experience isolation due to limited interactions with caregivers, caused by high assistant-to-client ratios and busy environments. This lack of engagement restricts their communication and social skills, exacerbates anxiety, and poses challenges in expressing thoughts, needs, or emotions. Such barriers affect their mental health and hinder access to education, employment, and social activities. Addressing these issues, this paper introduces an innovative AI system designed to improve verbal communication for those with learning disabilities, autism, or severe social anxiety. The system, similar to ChatGPT, offers conversational agents that provide guided scenarios for practicing social skills, companionship, and a means to combat isolation, benefiting individuals with neurocognitive disorders as well.

54. Corinne Whitehead, a Citizen
Tracy Kaeff
Undergraduate
History
History
Arts and Sciences

Faculty Sponsor: William Landon

Abstract: Mrs. Corinne Ramey Whitehead was a dynamic, engaged, and prolific advocate for the environment and for the citizens of western Kentucky. Mrs. Whitehead, born in 1923, was active in public life starting as a young woman and continuing into her old age. She was a naturalist and, when necessary, a citizen scientist. Her life is a blueprint for how we can effect change in our world. I present a short summary of the groups she joined or led, and the accomplishments of each group. Much of the data I've gathered comes from the Paducah Sun archives and from people who knew her. The amount of work that Mrs. Whitehead did is expansive, and I plan to continue this research in more depth. Corinne Whitehead was a public figure who should be remembered.

55. The Art of Freelance Journalism
Emily Sisk
Undergraduate
Journalism
School of Communication and Media
Informatics

Faculty Sponsor: Michele Day

Abstract: The art of freelance allows passionate journalists to continue reporting for diverse publications while maintaining another full-time workload. This semester, I am learning how to freelance from journalism professor of practice Michele Day. Throughout our semester, I have studied how to conduct market analyses to determine what types of stories would fit in certain publications. Pitching a story is one of the most difficult parts of freelancing, and by the end of the semester I will have submitted three unique story pitches. My goal is to publish at least one story in a publication I have never written for before. This freelancing skill is something I plan to continue building after graduation and into my career.

56. The Northerner Year in Review
Braden White
Undergraduate
Journalism
School of Communication and Media
Informatics

Faculty Sponsor: Michele Day

Abstract: The Northerner is NKU's independent, student-run news organization. This past year, our monthly magazine and weekly e-newsletter made a return, along with our social media channels, including a TikTok page that we launched this year. We provide content for the NKU community covering news, arts & life, sports and more! The Northerner also received the Jon Fleischaker Freedom of Information Award from the Kentucky Press Association for the use of open records while doing investigative reporting. From in-depth coverage of anti-DEI legislation, extensive coverage of NKU's homecoming and profiling top university administrators, The Northerner published nearly 250 stories in the last year.

57. A Journalistic Overview of the Greater Cincinnati Side Hustle Economy

Killian Baarlaer
Undergraduate
Journalism
School of Communication and Media
Honors

Faculty Sponsor: Michele Day

Abstract: Survey data estimates that 39% of people in the United States have side hustles. In this storytelling project, I deploy the journalistic process to capture the stories of individuals partaking in this trend. The project operates under the definition that a side hustle is a monetized activity someone does that is secondary to a main source of income. By examining and sharing the stories of several people in the tri-state area with side hustles, I create a fuller image of the local side hustle economy with the intent of sparking ideas among readers, encouraging local business, and identifying trends for further exploration.

58. Exploring part-time faculty at NKU

Braden White
Undergraduate
Journalism
School of Communication and Media
Informatics

Faculty Sponsor: Michele Day

Abstract: Part-time faculty taught around 25 percent of the classes at NKU last year. This directed research project investigated numbers behind the part-time faculty community and provides a behind-the-scenes look at the experiences of five part-time faculty, including a SOTA professor who won the Part-Time Faculty Excellence in Instruction Award, an English professor who is also an esteemed poet, a longtime Chemistry professor who's been teaching part-time at NKU since 1983 and a new part-time faculty member in the Haile College of Business who, although graduating in 2022 from NKU, is back in classroom as an instructor. The project will be published as a web multimedia package in The Northerner, NKU's student-run news organization.

59. Statistical Techniques for Validation of Medical Screeners

Charlie Frederick
Undergraduate
Statistics and Data Science
Mathematics and Statistics
Arts and Sciences

Faculty Sponsor: Joe Nolan

Abstract: Statistical methods are widely used in medical research. One area where statistics plays an important role is in validating screening tests for diseases. This poster examines the use of simple methods such as proportions, t-tests, chi-square analyses, ANOVA, etc. to assess the usefulness of various screening procedures within an application comparing two clinical tests in the area of cardiology. Within this context clinical tests are compared to determine how well each connects with known risk factors for disease.

60. Prenatal exposure to morphine and adolescent treatment strategy in mice

Noah Raleigh
Undergraduate
FYRE Student, Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: Prenatal exposure to morphine in mice can affect the prefrontal cortex of the offspring brain, leading to deficits in task-oriented learning abilities. The use of an immunotherapy treatment (mCSF) may help rescue the offspring's task-oriented learning abilities. In a controlled study, we tested the effect of mCSF treatment on the behavior of offspring mice after prenatal opioid exposure. We tested behavior using a screen touch learning task and a puzzle box task, which puts the mice in certain situations to learn how to escape. The data shows that mCSF treatment combined with prenatal opioid exposure may worsen touch screen learning.

61. Are College Basketball Rivalries Within Certain Conferences More Hostile?

Isabelle McCarthy
Undergraduate
Sports Business & Management
Marketing, Sports Business and Construction Management
Business

Faculty Sponsor: Joe Cobbs

Abstract: My purpose is to explore if there is a difference by conference affiliation in fan hostility towards intra-conference rivals, as measured by schadenfreude, discrimination, and prejudice.
Based on fans' superordinate identification with the SEC conference, I expect fans in the SEC to have higher hostility towards intra-conference rival fans, in comparison to the other conferences. As part of the Know Rivalry project, we surveyed college basketball fans (n=3311) from online message boards. Our three measures of hostility were taken from prior literature. This research is important to athletic marketing administrators and their broadcast partners charged with consumer demand growth.

62. Comparative Analysis of Animosity in Intra- and Inter-conference College Basketball Rivalries

Will (LaBryan) Horne
Undergraduate
Sports Business
Marketing, Sports Business and Construction Management
Business

Faculty Sponsor: Joe Cobbs

Abstract: This study investigates differences in fan animosity measured in schadenfreude, prejudice, and discrimination between intra-conference and inter-conference college basketball rivalries. Our proposition posits that inter-conference rivalries evoke greater fan animosity measures due to a lack of superordinate identification with the conference, which suggests the 3 antisocial measures in inter-conference matchups are typically higher. Our survey measures of sports fan animosity were adapted from literature on racial and cultural prejudice. We collected data through internet message boards as part of the Know Rivalry project (n = 3311). Understanding the dynamics of sports rivalries informs strategies for marketing and security tactics.

63. Stress Management & Mental Blocks in Gymnastics

Olivia Curtis
Undergraduate
Integrative Studies
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: Gymnastics is a sport that heavily relies on the connection between mind and body. It's common for gymnasts to experience mental blocks, the phenomenon in which the mind prevents the body from performing a previously learned skill. This study's purpose is to further explore such connections by analyzing the stress coping techniques of gymnasts ages eleven and up. In doing so, we want to learn whether or not stress coping techniques relate to the prevalence and frequency of mental blocks for gymnasts. These results will be found through a Qualtrics survey conducted at local gymnastics centers.

64. The impacts of invasive species on wetland use by migratory and native birds.

Logan Shepherd
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Richard Durtshce

Abstract: Biodiversity is affected globally by habitat alteration. One threat to natural habitats is invasive species. We are studying the impact of invasive species on bird diversity and abundance in wetlands at the Northern Kentucky University Research and Education Field Station. These wetlands are divided with invasive plants eradicated from the south half and not from the north half. Using Cornell University's Merlin app and binoculars, we are conducting surveys of bird species and their abundance inhabit each wetland. Our null hypothesis is that there will be no difference in the bird species diversity and abundance between the different wetlands.

65. A Comparison of Views, Relationships, and Outlooks of Direct and Indirect Student Caregivers

Shelby Baker
Undergraduate
Psychology, Criminal Justice
Psychological Science
Arts and Sciences

Faculty Sponsors: Allyson Graf and Robin Bartlett

Abstract: Research on student caregiving is limited and thus little is known about different types of student caregivers. In this study, participants (n=74) completed a survey that asked them to identify their caregiving role and to rate aspects of their caregiving experience. A series of t-test analyses will compare direct and indirect caregivers in terms of their views on caregiving, relationships with care recipients and others, and outlooks on wellbeing and aging. Results will be discussed in terms of how universities may provide information and resources to support diverse caregiving experiences.

66. Predictive Analysis of Computer Hardware Prices through Machine Learning

Idalia Martin, Dimitrios Stathis, Robby Peddicord, and Andrew Stevens
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Junxiu Zhou

Abstract: When it comes to choosing computer hardware, it is important to consider different factors such as performance, compatibility, and budget constraints. As the demand for high-performing computing systems continues to rise, our goal is to use machine learning to enhance the decision of computer hardware. Specifically, we intend to predict the prices of computer hardware, through a dataset we categorize based on CPU, GPU, RAM, and SSD components. Through the application of the machine learning model, our objective is to forecast hardware prices, thereby improving user decision-making.

67. The effects of water conductivity on the respiration rates of larval salamanders.

Sam North and Dylan Mull
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Aquatic larval salamanders respirate using external gills. How elevated water conductivity levels, affect this system of respiration and the metabolism of these organisms is currently unknown. To investigate, we tested larval forms of four native Kentucky salamander species. The testing utilized a intermittent static flow respirometry system with fiber optical dissolved oxygen sensors. These measurements were performed under two different conductivity levels. We found that salamanders at higher conductivities showed trends for higher but erratic metabolic rates. Some species show trends towards decreased fitness. These trends could be observed in natural streams suffering pollution impacts.

68. AI-driven Job Seeking

Stacey Sanchez Gomez
Undergraduate
FYRE Student, Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Junxiu Zhou

Abstract: Our research examines AI's roles in job searches, aiming to streamline the process by analyzing profiles and postings for personalized recommendations. Employing natural language processing and machine learning, AI efficiently matches candidates with suitable opportunities, saving time and enhancing matches. We cataloged AI's roles in job search, then analyzed 600 job posts, focusing on data science positions, using data science tools. Our goal is to show improved accuracy in matching candidates to jobs, reduced search time for candidates, and enhanced efficiency for employers. Our findings underscore AI's transformative potential in optimizing job search processes, benefiting both candidates and employers.

69. Intrusion Detection and Prevention in Edge-Computing Frameworks

Nishar Miya
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Rasib Khan

Abstract: This research presents a new security approach for edge computing, aimed at overcoming the shortcomings of traditional security in decentralized, device-rich environments. We focus on preemptive intrusion detection and prevention, using machine learning for threat analysis across distributed networks. Our methodology, integrated with the EdgeX Foundry platform, enhances device coordination and centralizes monitoring, establishing a resilient defense against edge-specific vulnerabilities. Our findings demonstrate that proactive security measures significantly bolster edge computing's security posture, ensuring data integrity and confidentiality. This comprehensive solution addresses the critical security challenges inherent in edge computing frameworks.

70. Ensuring Secure Service Provenance in Edge-Computing Frameworks

Sajan Poudel
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Rasib Khan

Abstract: This study presents a novel framework to ensure secure service provenance in edge computing, addressing its inherent security challenges. Our approach authenticates and maintains service transaction integrity across distributed nodes by leveraging cryptographic techniques such as digital signatures and distributed ledgers. By prioritizing a transparent and robust service provenance infrastructure, we establish a verifiable audit trail for accountability. Implementing a proof-of-concept using EdgeX Foundry, we streamline deployment and centralized management of secure services, enhancing oversight and auditing capabilities. Our architecture significantly enhances trustworthiness and accountability in decentralized edge computing, promoting the adoption of secure and reliable services.

71. Use of Rotarod to Analyze Motor Function in Cyp1b1 (+/+) and Cyp1b1(-/-) mice after Developmental Benzo[a]pyrene Exposure

LeaAnn King, Mickayla Kowalski, Kayla Wypasek, Jade Perry, and Joseph Ashley
Undergraduate
Biology, Computer Science and Neuroscience
Biological Sciences and School of Computing and Analytics
Arts and Sciences and informatics

Faculty Sponsor: Christine Perdan Curran

Abstract: Benzo[a]pyrene (BaP) is a polycyclic aromatic hydrocarbon found in vehicle exhaust, cigarette and wildlife smoke, and grilled food. BaP has been linked to adverse human health effects including cancer and cognitive deficits in children exposed during pregnancy and early life. Cytochrome P450 1B1 (CYP1B1) is responsible for metabolizing PAHs. To determine if genetic differences affect susceptibility to developmental BaP neurotoxicity, we compared Cyp1b1(+/+) wild type mice and Cyp1b1(-/-) knockout mice. We tested motor function using Rotarod when the offspring were young adults. Our data suggest that developmental BaP exposure results in adverse effects on motor function in both lines of mice.

72. The effect of developmental benzo[a]pyrene exposure on spatial learning and memory in Cyp1b1 wild type and knockout mice

Allie Easton, Alston Gray, Nate Wendt, Annika White, and Duong Pham
Undergraduate
FYRE Students, Biology, Neuroscience
Biological Sciences
Arts and Sciences

Faculty Sponsor: Christine Perdan Curran

Abstract: The Morris Water Maze is a test of spatial learning and memory. Mice use visual cues to locate an escape platform in a pool of water. We used the test to determine if there are genetic differences in susceptibility to the widespread pollutant benzo[a]pyrene (BaP). Pregnant Cyp1b1(+/+) wild type and Cyp1b1 (-/-) knockout mice were treated with BaP from gestational day 10 through postnatal day 25. Offspring were tested as young adults. There were significant differences in the most difficult phase of the test. BaP-treated mice and control Cyp1b1(-/-) knockout mice were impaired compared with control wild type mice.

73. Using High-performance liquid chromatography to measure neurotransmitter levels in Cyp1 wild type and knockout mice exposed to benzo[a]pyrene during early brain development

Asia Good, Mackenzie Feltner, Elizabeth Krampe, and Annika White
Undergraduate
Health Sciences and Neuroscience
School of Allied Health and Biological Sciences
Health and Human Services and Arts and Sciences

Faculty Sponsor: Christine Perdan Curran

Abstract: Benzo[a]pyrene (BaP), a polycyclic aromatic hydrocarbon (PAH), is a widespread pollutant that exerts neurotoxic effects on early brain development. To look for genetic susceptibility to BaP neurotoxicty, we compare mice with differences in the enzymes involved in BaP metabolism, Mice are exposed during pregnancy and lactation, and one female and one male per litter goes through neurobehavioral studies. After behavior experiments, we collect brain regions for neurotransmitter analysis including the striatum, hippocampus, prefrontal cortex, and hypothalamus. We use high-performance liquid chromatography with electrochemical detection to measure dopamine, serotonin, and their metabolites (5-HIAA and DOPAC).

74. Creativity Demystified

Sadie Kimberlin
Undergraduate
FYRE Student, 3D Digital Design and Visual Effects
School of Communication and Media
Honors

Faculty Sponsor: Jen Cellio

Abstract: We learn early that creativity is essential to be successful or to stand out in any field. We see the products of creativity everywhere, and we experience it in our everyday lives. However, we seldom take time to define or explore it, which in turn encourages us to glorify it and view it as unattainable.

This narrow view of creativity is compounded by the fact that many people do not know how creativity works. Thus, the goal of this paper is two-fold: to investigate how we understand and view creativity and to demystify it for a general audience.

75. Effects of Environmental Variations on Coral Health

Chloe Donithan, Lydia Goins, Paige Sefton, Jordan Clark, and Ashley Denney
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Charles Acosta

Abstract: Tropical coral reefs are declining globally due to climate change and other environmental factors. We present a broad overview of what we know and what we do not understand about environmental stressors on coral health. In the NKU Coral Lab, we have been conducting studies on coral growth and survival under different light spectra (PAR 450 vs 700) to understand depth distribution. We have also explored how reef fish may supplement nutrients, and so influence the symbiotic relationship between corals and their zooxanthellae. Our aim is to contribute to understanding of environmental variation and coral health, and so, impact conservation measures.

76. Isolation of a novel antimicrobial producing Streptomyces sp. LL7 from an old growth forest in Northern Kentucky

Lillian Leiner
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Joshua Cooper

Abstract: Antibiotic resistance is increasing, resulting in greater rates of mortality. Recent investigations reveal an increasing prevalence of antibiotic resistant pathogenic bacteria, emphasizing the critical need for new antimicrobial discoveries to overcome resistance. Antibiotic overuse and prescription contributed to the growth of resistance. Twenty-one morphologically distinct actinomycete isolates were isolated from beech trees in Northern Kentucky old growth woods and cultivated on selective medium. Using a agar plug diffusion method against 10 ESKAPE pathogens, three isolates (LL6, LL7, and LL8) demonstrated antibiotic action, and we sequenced the genome of LL7. Further work is required to identify the compound's structure.

77. Plastic Recycling Plants as a source of Novel Hexadecane-Degrading Bacteria with Potential to Degrade Environmental Pollutants

Alex Schroeck
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Joshua Cooper

Abstract: Plastic pollution is a serious worldwide issue requiring novel ways to eliminate or restore land and aquatic ecosystems. We used enrichment and bacterial isolation techniques to identify four organisms capable of degrading plastics using an analog n-hexadecane. Sequencing the genomic of strain H4-1 revealed a 4.1 million base pair circular genome and a 60,000 bp plasmid. Interrogating the genome, we examined genetic mechanisms that allow for n-hexadecane degradation, and additional laboratory experiments. This discovery might lead to eco-friendly pollution prevention and targeted bioremediation for polluted locations, advancing environmental sustainability.

78. Isolation of a potential toxin producing cyanobacteria, Nodosilinea sp. CK1.

Casey King
Undergraduate
Chemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Joshua Cooper

Abstract: Cyanobacteria, which are notorious for creating toxins harmful to both people and animals, provide significant challenges to researchers due to the difficulty of isolating and identifying toxin-producing species. Environmental samples were obtained from several rivers, lakes, and pond and tested across multiple growth media. None of the cyanobacteria that grew effectively produced known toxins via HPCL determination. A modified Z8 media produced the most isolates. Nodosilinea sp CK1, a "potential" toxin producer, was selected for genome sequencing. Further research is needed to identify under what conditions the media performs best.

79. Evaluating astrocyte quantity to understand brain and behavioral changes after prenatal opioid exposure

Grace Winstel
Undergraduate
Neuroscience and Psychology
Psychological Science
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: Astrocytes, support cells of the nervous system, may mediate the neural changes associated with opioid exposure. Opioids can inhibit astrocyte growth and development, but there is no current research focusing on astrocytic changes from prenatal opioid exposure. We measured changes in astrocyte quantity in the anterior commissure of adolescent mouse brains which were prenatally exposed to either morphine, buprenorphine, or saline solutions via maternal injections. Ongoing analysis of immunohistochemical staining is testing the hypothesis that astrocyte quantities will be significantly reduced in the brains of mice exposed to morphine or buprenorphine compared to healthy controls.

80. Course-Based Undergraduate Research Experience (CURE): Synthesis and Characterization of Tropinone Compounds

Chloe Hopper
Undergraduate
Neuroscience
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Heteroaryl compounds, exemplified by tropinone, hold significance in medicinal chemistry owing to their anti-cancer attributes. Tropinone derivatives exhibit the capability to trigger apoptosis in cancerous cells by impeding the Akt pathway. Microwave-assisted reaction technology accelerates the synthesis process of these molecules, condensing the reaction time from 20 hours at ambient temperature to a mere 20 minutes at 140°C with microwave assistance. Subsequently, the product underwent a battery of tests to verify its purity, oral bioavailability, and pharmacological efficacy.

81. Determining the requirements of tRNA binding by Trm7, Trm732, and Trm734

Anabel Lillie, Gwalima Gwalima, and Ella Mahaney
Undergraduate
Biochemistry, FYRE Student, Chemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Michael Guy

Abstract: Trm7 plays a catalytic role in methylation activity, and Trm732 and Trm734 are predicted to bind and position tRNAPhe for methylation at nucleotides C32 and G34 in Saccharomyces cerevisiae. Defects in Trm7 cause a sick phenotype in S.cerevisiae. Defects in the Trm7 human ortholog, FTSJI, causes intellectual disability. An experimental approach is being developed in yeast to determine whether individual Trm7, Trm732, and Trm734 can bind to tRNAPhe. This includes the individual proteins and the complexes that these proteins form with tRNA. This approach also includes determining if non-functional mutated variants still have the ability to bind to tRNAPhe.

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

Ashton Davey
Undergraduate
Data Science
Chemistry
Arts and Sciences

Faculty Sponsor: Michael Guy

Abstract: tRNA modifications are pivotal to translation. 2'-O-methylation at tRNA position 39, exclusive to multicellular eukaryotes, lacks a known enzyme. We hypothesize that a guide RNA is responsible for Nm39. Bioinformatics script PLEXY identified candidate guide RNAs, which were validated using a public dataset of naturally occurring guide RNA-tRNA hybrids. Requirement for guide RNAs will be tested by RNA interference in cultured cells and by expressing candidate guide RNAs and tRNAs in yeast. Presence of Nm39 will be determined by partial base hydrolysis and primer extension, LC-MS, or nanopore sequencing. This research aims to illuminate guide RNA-tRNA interactions.

83. The American War on Invasive Species: How Discourse Restricts American Perception and Management of Invasive Species and Reflects Xenophobia

Elyse Czechorski
Undergraduate
Anthropology
Sociology, Anthropology and Philosophy
Arts and Sciences

Faculty Sponsor: Jen Cellio

Abstract: Discourse about invasive species reveals how Americans perceive these species and shapes how we manage them. Peppered with militaristic, nationalistic, and xenophobic rhetoric, this "discourse is underpinned by language of 'invasions' and 'aliens' that positions invasive species as 'natural enemies' that 'threaten' human and environmental values" (Bach and Larson 2017, 562). This rhetoric prompts an antagonistic, "war-like" response to these species, while simultaneously undermining scientific objectivity and restricting how they are perceived and managed (Bach and Larson 2017). Using rhetorical analysis, I present examples of this discourse and offer alternatives that bypass nationalism and xenophobia and move toward less value-laden discussions.

84. Enhancing Academic Productivity and Engagement with AI

Ba Ta and Lulseged Admasu
Undergraduate and Graduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Nicholas Caporusso

Abstract: The current landscape of academia involves a wide array of resources such as funding opportunities, scholarly articles, academic positions, and complex processes including the peer review and publication workflow. Resources are often fragmented and difficult to engage with, especially for individuals beginning their careers. Our research involves the design and development of a full-stack platform that, thanks to single- and multi-agent configurations, combines the capabilities of Large Language Models to provide researchers with matchmaking with relevant opportunities, facilitate the peer-review process, and transform complex research articles into accessible content for diverse audiences.

85. Claisen-Schmidt Condensation
Connor Kurki
Undergraduate
Integrative Studies
Integrative Studies
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: The purpose of this work is to study the Claisen-Schmidt condensation of a ketone and an aldehyde. The use of tropinone and benzaldehyde to produce an a,ß-unsaturated ketone has been reported to have antitumor properties. In this work, the Claisen-Schmidt condensation between cycloheptanone (I17) and benzaldehyde (D0) was carried out as the model reaction. The goal of this research is to optimize the reaction conditions from a solution-based reaction to a "greener" solventless reaction. The research findings will enable an efficient and environmentally friendly approach to synthesize anti-cancer compounds.

86. Hybrid CNN-RNN Approach for EEG-Based Brain-Computer Interaction
Nathan Reed and Vu Tran
Undergraduate
Computer Science and Mechatronics Engineering Technology
School of Computing and Analytics and Physics, Geology and Engineering Technology
Informatics and Arts and Sciences

Faculty Sponsors: Mahdi Yazdanpour and Yangyang Tao

Abstract: Brain-Computer Interfaces (BCIs) enable direct communication between brain and external devices. We propose a novel EEG-based BCI system utilizing Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs). The proposed BCI decodes neurosignals to translate intentions into commands. EEG data undergo preprocessing, followed by dual-path processing using CNNs and RNNs to capture spatial and temporal dependencies. Our results demonstrate the superiority of this hybrid architecture in accurately classifying EEG patterns and decoding user intentions. This study showcases the potential of combining CNNs and RNNs in EEG-based BCIs, promising efficient and intuitive brain-computer interaction for healthcare, assistive technology, and human-computer interaction.

87. Thioamide Synthesis in Sophomore Organic Chemistry Lab
Faith Nwobi
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: The research focuses on the one-step heteroarylation of thioamide, employing a novel synthetic approach. Utilizing different advanced analytical techniques such as NMR, IR, and computer modeling, we clarified the reaction mechanism and characterized the resulting heteroaryl-thioamide compound. This study did not only expand the toolkit for thioamide functionalization but also provides valuable insights into the reaction's intricacies. The findings also contribute to the CURE lab's goal of developing efficient and sustainable synthetic methodologies. Additionally, the project enhances undergraduate research opportunities by offering students hands-on experience in modern synthetic chemistry and cutting-edge analytical techniques, creating a dynamic and engaging learning environment.

88. Advancing Prosthetic Technology: 3D-Printed Robotic Arm with Micro Linear Actuators
Vu Tran and Nathan Reed
Undergraduate
Mechatronics Engineering Technology and Computer Science
Physics, Geology and Engineering Technology and School of Computing and Analytics
Arts and Sciences and Informatics

Faculty Sponsors: Mahdi Yazdanpour and Yangyang Tao

Abstract: The demand for affordable and accessible prosthetic solutions drives innovation in the field of robotics. This project presents a 3D-printed robotic prosthetic arm for upper limb amputees. Using five micro linear actuators for precise and naturalistic movement, it prioritizes affordability and accessibility through 3D printing. With advantages like compactness and efficient power use, it offers a cost-effective alternative to traditional bionic arms. By leveraging 3D printing and microactuator technology, the goal is to empower individuals with limb amputations to lead independent and fulfilling lives. This initiative represents a significant step in enhancing prosthetic accessibility and affordability, potentially impacting millions worldwide.

89. Large Language Model Recognition of Common, Uncommon, and Abstract Languages

Ben Lambert
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsors: Kevin Kirby and Junxiu Zhou

Abstract: Analyzing diverse language structures unveils human linguistic patterns. Large language models extract these patterns to generate text effectively in a given language. The emergence of AI chatbots raises the question: How do current models recognize patterns from sentences generated from common, uncommon, and abstract artificial languages? By constructing a toy English grammar and a non-English abstract grammar, I have discovered how chatbots can define syntactical grammars based upon sentences from these subsets of languages. This presentation will share the process and explore how these findings may help people learn other languages, including rare, obscure, or extinct languages.

90. Effects of Maternal Helminths on Microglial Development in Offspring

Austin Clifton and Maddie Buroker
Undergraduate
FYRE student, Biology and Neuroscience
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lauren Williamson

Abstract: Early-life inflammation can permanently affect cognition. Microglia, crucial brain immune cells, rapidly develop after birth, responding to challenges. Prenatal and neonatal environments influence neuroinflammation. We studied rat tapeworm treatment in mothers to induce anti-inflammatory signals and assessed offspring microglia development. Female Sprague-Dawley rats received tapeworms or saline. Brains were collected on postnatal days (P) 1, 4, and 7. On P4, pups were injected with E. coli or PBS and tissue was collected on P5 and P7. Brain slices stained for Iba1 showed varying microglial morphologies, dependent on age and maternal treatment.

91. The temporal synchrony of female and male flowering time of Northern spicebush and the impacts from climate change

Jayme Burks
Undergraduate
FYRE student, Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Yingying Xie

Abstract: Climate change affects the timing of seasonal life events of plants, such as flowering time. However, it is still unknow how the synchrony between female and male flowers of plants is affected by warming. We focus on a native shrub in the United States, Northern spicebush. We observe the flowering time for 10 female and 10 male individuals in the field and annotate photos from iNaturalist records. We expect the male flowers open earlier and are more sensitive to warming than female flowers. This project will help assess climate change impacts and predict the temporal mismatch in the future.

92. Conversational AI for Disaster Response in Edge Computing Environments

Shiva Khatri
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Rasib Khan

Abstract: Effective disaster response in areas with limited connectivity is pivotal. We propose a novel approach integrating conversational AI with multi-threaded systems for post-disaster workers. Leveraging the open-source AI model in distributed systems enables rapid deployment and reduced overload. This fusion facilitates real-time communication critical for immediate assistance in scenarios like hurricanes and floods. Our interdisciplinary collaboration bridges AI, multi-threaded systems, and distributed architectures, addressing integration challenges and laying the groundwork for efficient disaster response systems. This research underscores the importance of user-centric service in disaster management, providing implications for future deployments.

94. JR's Guns in America Chronicles: Can we have a conversation?
Aiden Stanton
Undergraduate
FYRE Student, Spanish & French
World Languages and Literature
Arts and Sciences

Faculty Sponsor: Gisèle Loriot-Raymer

Abstract: French photographer JR has opened a gateway to having civil conversations around divisive social issues. For his 2018 multimedia mural Guns in America, JR photographed and filmed 245 individuals with different viewpoints on guns, and collaged their portraits into one photographic mural promoting the importance of listening and talking with each other. Can this art change the world? Maybe this art cannot, but it has started conversations. My project will highlight the wide spectrum of viewpoints on gun ownership and explore the role art can play in providing a space for meaningful exchange and finding common ground.

95. Impact of Climate Change and Invasive Plant Habitat on Amphibian Larvae Growth Patterns
Regan McKinley, Sydney Thomas, and Alex Walsh
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Richard Durtsche

Abstract: Climate change and invasive species have increasing impacts on biodiversity and amphibian populations globally. Amphibians (frogs and salamanders) are sensitive to these environmental changes in habitat, temperature, and pond hydroperiods. Last year (2023), the hottest on record, had some ponds completely dried at the NKU Research and Education Field Station (REFS). Wetlands at REFS are also divided and include both invasive and non-invasive plant habitats. This study will assess the impact on amphibian larvae of climate (on two-year green frog tadpoles) and invasive plant habitat (on salamander larvae) to determine if their growth patterns have been affected.

96. The Personality and Lifestyle Traits that are Found in Today's Radiation Therapists
Isabella Payne
Undergraduate
FYRE Student, Radiation Therapy
School of Allied Health
Health and Human Services

Faculty Sponsor: Julie Lasley

Abstract: What personality traits are evident in a radiation therapist? How do these personality traits (if any) affect their patient care skills? What other qualifications describe a professional radiation therapist? This project conducts an observational study on what personality traits are commonly found within the radiation therapy profession by shadowing at St. Elizabeth's Edgewood radiation oncology department for two weeks. By observing the behaviors of the radiation therapists and compiling data, this project will develop common themes to answer these questions.

97. Deep Learning Recognition of Biodiversity in Northern Kentucky Trees
Ben Lambert, Xander Chua, and Wasiu Ogunlana
Undergraduate
Computer Science
School of Computing and Analytics
Informatics

Faculty Sponsor: Junxiu Zhou

Abstract: This study explores the efficacy of a deep learning model in distinguishing various leaf types indigenous to Northern Kentucky. With the use of neural networks (CNNs) and extensive image datasets, the model effectively discerns subtle variations among leaves. Through meticulous training and validation processes, the model achieves high accuracy in classifying different leaf species prevalent in the region. The research contributes to biodiversity monitoring efforts and offers a scalable solution for automating leaf identification tasks. Results demonstrate the potential of deep learning approaches in advancing ecological studies and fostering sustainable environmental practices in the Northern Kentucky region.

98. Characteristics of patients enrolled for Nutritional and Exercise in Critical Illness Trial (NEXIS Trial) at the University of Kentucky

Philip Bright
Graduate
University of Kentucky College of Medicine - NKY Campus
Medicine
Faculty Sponsor: Jamie Sturgill

Abstract: Post-Intensive Care Syndrome (PICS) describes the decline in physical and cognitive function that persists following recovery from the intensive care unit (ICU). Nutrition and Exercise in Critical Illness (NEXIS) investigates whether diet and exercise intervention involving 15% CLINISOL IV amino acid supplementation plus in-bed cycle ergometry exercise can improve ICU recovery of patients with acute respiratory failure and decrease the overall incidence and burden of PICS. We will discuss overall trial design and applicability to future studies, major barriers to enrollment, and outcomes of patients enrolled. Screening for NEXIS is ongoing thus no conclusions can be drawn to date.

99. Variations in the Lunar Crust Using Seismic Data

Sierra Ison
Undergraduate
Geology
Physics, Geology and Engineering Technology
Arts and Sciences

Faculty Sponsor: Nilesh Dixit

Abstract: Vital clues to planetary evolution can be found from lunar geological history as it is not well preserved on Earth. Seismic data from the Apollo missions can be used to decipher lunar crustal variations. This study involves a thorough literature review examining existing data and how it has been used as well as a data interpretation phase. By examining seismic wave velocities, layer thickness, and seismic event frequencies, insights into lunar crust composition and structure are gained. Understanding these variations can build a broader understanding of planetary geological processes including formation and evolution.

100. Course-based Undergraduate Research Experiences (CUREs): Synthesis, Characterization and Scale-Up of Thioamide Compounds

Karra Hendrickson
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Organic synthesis plays a pivotal role in drug discovery, serving as the cornerstone for unraveling molecular interactions essential for pharmaceutical design. This study embarks on a journey to comprehend the intricacies of designing heterocyclic compounds capable of engaging aromatase, a critical target in breast cancer treatment. Focused on thioamides as a promising starting point, we explore their potential to yield diverse heterocyclic moieties, particularly thiazole groups. These compounds hold promise for future investigations aimed at elucidating their biological and pharmaceutical roles as potent anti-cancer agents. This research underscores the pivotal role of organic synthesis in paving the way toward innovative therapeutic interventions for breast cancer and beyond.

101. Organic Synthesis of E12 Products by Esterification and Claisen-Schmidt Reaction.

Jacob Gildenblatt
Undergraduate
Biochemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: The object of this study was to a complete the organic synthesis of two target molecules, E12-O12 and E12-J52 and ascertain their attributes. These molecules share reactant molecule E12, which undergoes an esterification and Claisen-Schmidt reaction in each respective reaction. E12, known as 3-phenylpropanol (C9H12O), has a high amount of applications across many chemistry disciplines. Solvent free reaction schemes were utilized to assess viability of green chemistry principles being applied. Product yields were analyzed via IR and NMR spectroscopy to determine purity and identity. Successful isolation of product molecules was conducted.

102. WGCNA analysis of transcriptional dynamics linked to executive function deficits in prenatal opioid exposure

Brandon Brooks-Patton
Undergraduate
Neuroscience/Computer Science
Biological Sciences
Arts and Sciences

Faculty Sponsor: Brittany Smith

Abstract: Exposure to opioids in utero is linked to higher rates of behavioral issues in children, often leading to deficits in executive function. Opioid-triggered TLR4 immune response necessitates transcriptional investigation of microglial activity in populations prenatally exposed. Correlating transcriptional dynamics with behavioral output is highly complex, leaving results that are difficult to interpret. A weighted gene co-expression network analysis (WGCNA) was used to build similarly co-expressed gene networks that correlated with behavioral phenotypes associated with prenatal opioid exposure in mice. Some of these networks shows a potential inverse relationship between male experimental and female control groups.

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

Mario Mata
Undergraduate
Engineering Physics, FYRE Students, and 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 Galatic Nuclei (AGN) with the NASA Neil Gehrels Swift mission in order to study their long-term variability and correlate this with other AGN properties like black hole mass and accretion rate. In addition, we use Swift to detect AGN in extreme X-ray flux states. 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 a line-of-sight absorber. A detection will trigger follow-up observations with two other X-ray missions, XMM-Newton and NuSTAR. The XMM-Newton and NuSTAR observations allow for a study of the ionized matter closest to the central supermassive 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.

104. Assessing The Alignment of Modern AI Wearable Devices With Trustworthy AI Requirements: A Preliminary Study

Nick Carter and Ashley Bessong
Undergraduate
Cybersecurity and FYRE Student
School of Computing and Analytics
Informatics

Faculty Sponsor: Ankur Chattopadhyay

Abstract: We performed a unique experimental case study with a set of smart glasses and smart watches, that are representative of the modern AI wearable devices. In this novel study, we tested the AI functionalities of these devices and analyzed them to assess their overall alignment with existing standards and recommendations for Trustworthy AI (TAI). Our initial tests show instances where the AI features within these devices might affect the users negatively and pose potential risks to the consumers. We explore their potential risk levels in context of user acceptability as AI consumer products, as per the upcoming EU AI Act.

105. Exploring The Need To Cover Trustworthy AI and The EU AI Act Within The Higher Education Curriculum for Cybersecurity - A Gap Analysis Study

Logan Witwer
Undergraduate
Cybersecurity
School of Computing and Analytics
Informatics

Faculty Sponsor: Ankur Chattopadhyay

Abstract: The Trustworthy AI (TAI) requirements and the upcoming AI act, as per EU regulations, are important landmark topics associated with risk assessment and management of AI technologies, including determination of risk levels and compliance of modern AI consumer products for user acceptability. However, most of the current higher education curricula for cybersecurity do not cover the TAI requirements and/or the EU AI Act. In this gap analysis research study, we examine several cybersecurity program curricula across higher education institutions, including several popular risk assessment/management textbooks, to report our findings, that show this lack of coverage of TAI/EU Act related topics.

106. Characterization of chorismate synthase in Neurospora crassa - one enzyme, two functions
Elisabeth Goodin, Julia Hageman, and Jamie Richey
Undergraduate
Biochemistry
Chemistry
Arts and Sciences

Faculty Sponsor: Catherine Shelton

Abstract: Chorismate synthase (CS) is the last enzyme in the shikimate pathway, which generates the molecule chorismate. Chorismate is used in the biosynthesis of aromatic amino acids. Neurospora crassa CS is bifunctional: able to simultaneously create chorismate and reduce FMN. By using crystallography and biophysical characterization we hope to elucidate structural information, including ligand positions and oligomeric interfaces, which will help determine the mechanism of reductase activity seen in bifunctional CS enzymes. Being able to fully understand CS could provide multiple means to execute enzyme-catalyzed reactions, which could make the process of researching treatments faster and more cost-effective.

107. Optimization of a Biocatalytic Reaction for the Synthesis of Chorismate
Anthony Bloomer, Anh Nguyen and Jamie Richey
Undergraduate
Chemistry, Biochemistry and Biology
Chemistry and Biological Sciences
Arts and Sciences

Faculty Sponsor: Catherine Shelton

Abstract: Production of isotopically labelled chorismate is a bottleneck preventing the measurement of kinetic isotope effects of chorismate-utilizing enzymes. The Shelton lab is assembling a bio-catalytic cascade for the enzymatic synthesis of chorismate. For the purposes of optimization, these nine enzymes have been divided into three modules; module two, the focus of the present work, includes the first four enzymes of the shikimate pathway. To identify ideal conditions for the enzyme reactions and the separation of intermediates, we have tested variables including temperature, incubation time, and buffer conditions, as well as the presence of additives to separation solvents.

108. Novel DNA-based Vaccines for Flaviviruses
Jessica Bryndal
Undergraduate
Biological Sciences
Biological Sciences
Arts and Sciences

Jorggedyg Castillo -Perez
Undergraduate
Biological Sciences
Biological Sciences
Arts and Sciences

Faculty Sponsor: Joseph Mester

Abstract: This project focuses on the generation and characterization of novel DNA-based vaccines for human flaviviruses. This virus family includes hepatitis C virus, Dengue virus, Zika virus, and West Nile virus. The vaccines are being tested for their ability to express the viral targets in human cells. The vaccines are also being evaluated for their immunogenicity in human immune cell cultures. Results from these experiments will demonstrate the potential of DNA-based vaccines for stimulating protective immune responses to human flaviviruses.

109. Simulation Innovation: Exploring the Efficacy of In-Situ Mock Codes on ACLS Education
Ava Sills
Undergraduate
Nursing
School of Nursing
Health and Human Services

Faculty Sponsor: Brittany Sorrell

Abstract: This research project explores the impact of annual in-situ mock codes on the comfort and competence of inpatient nurses in Advanced Cardiovascular Life Support and Basic Life Support skills. Recognizing the critical nature of Code Blue situations, this paper investigates whether these simulations enhance nurses' readiness to respond effectively during emergencies. The research addresses the need for ongoing education, especially in non-critical-care units, where the risk of in-hospital cardiac arrests remains substantial. This study recommends the incorporation of annual in-situ mock codes for nurses to enhance their ACLS skills, ultimately contributing to optimal patient outcomes.

110. Course Based Undergraduate Research Experiences(CURE): Chemical Modification on Tropinones to Discover Anti-cancer Agents

Amari Scroggins
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Manav Pradhan
Undergraduate
Biology
Biological Sciences
Arts and Sciences

Faculty Sponsor: Lili Ma

Abstract: Chemical modification of tropinone has been useful in both medical and chemical research. Tropinone derivatives have been studiedfor tumor treatments and cancer therapy. These molecules have predicted to have enhanced drug-like properties and binding affinity which leads to the tumor treatment. The reaction was performed in solventless condition with a stirring bar at 100 degrees Celsius for 1 hour. Major findings so far include the optimized reaction conditions and the IR and NMR data for the purified products, which contributes to the research of tropinone derivatives and their potential role in tumor treatments and cancer therapies.

VIRTUAL PRESENTATIONS

A Qualitative Analysis of Social Media Posts on Mental Health Self-Diagnosis

Grace Riley
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Psychology/English
Psychological Science
Arts and Sciences

Faculty Sponsor: Amanda Brockman

Abstract: Mental healthcare professionals agree that social media self-diagnosis is not ideal. There are issues that can arise from self-diagnosis, such as not seeking proper treatment, the "nocebo" effect, and valuing a label over addressing symptoms. Rather than placing blame on people who are experiencing perceived struggling (which is real struggling, regardless of the source), we need to ask why this is happening. What has gone wrong in the psychiatry/psychology sphere that has caused people to avoid seeking mental health treatment? What are the road-blocks, and how can they be reduced? Overall, what is the perception of psychiatry amongst these individuals? This project seeks to conduct a qualitative research analysis of public social media posts pertaining to mental health self-diagnosis.

How Algorithms Contribute to the Loneliness Epidemic

Jesse Whitt
Undergraduate
Integrative Studies
Integrative Studies
Arts and Sciences

Faculty Sponsor: Yasue Kuwahara

Abstract: In 2023, U.S. Surgeon General Vivek Murthy declared that the U.S. was in the middle of a "loneliness epidemic." An official advisory describes the societal impact of loneliness and isolation, as well as some of the driving causes of rising rates of these afflictions. The advisory briefly touches on technology as a driving force behind loneliness. The algorithms that control our social media habits are manipulating our natural tendencies to gravitate towards extreme content and group ourselves within tribal "Us-vs-Them" communities. This manipulation is a key factor in the loneliness epidemic, greatly exacerbating the problem.

Bridging the Digital Divide for Senior Citizens: A comparative analysis of libraries across the United States
Alisha Short
Undergraduate
Library Informatics
School of Computing and Analytics
Informatics

Faculty Sponsor: Hailley Fargo

Abstract: This project aims to study strategies for bridging the digital divide among senior citizens in the United States through an analysis of digital initiatives in twenty-one libraries across five regions. Extensive library research has been conducted, including interviews with staff and analysis of digital resources and programs. Additionally, the project will explore assistive technology implementation and develop recommendations for libraries based on effective initiatives. Findings presented through a PowerPoint presentation, an informative infographic, and an implementable guide aim to identify effective methods and offer suggestions that promote digital inclusion among seniors, ultimately contributing to a more equitable society.

Is There an Impact on Children with Cerebral Palsy and their Quality of Life and the Long-Term Developmental Outcomes when Early Intervention (occupational therapy, other therapies, etc.) is Involved?
Hannah Boden
Undergraduate
Exercise Science
School of Kinesiology, Counseling, and Rehabilitative Sciences
Health and Human Services

Faculty Sponsor: Jennifer Kaiser

Abstract: This research is important because Cerebral Palsy affects so many people and therapies such as occupational therapy just keeps growing. I want to know if early intervention, like OT and PT, have long-term developmental outcomes and improve quality of living for those living with CP. My approach is to collect data and see what the research shows. I also am spending the Spring semester in an internship where I can observe therapists with patients who have CP. Hopefully, as an aspiring occupational therapist, the data will show that OTs are detrimental to improving quality of living for CP patients.

The Extinction of Football
Olivia Stewart
Undergraduate
Accounting
Accounting, Economics and Finance
Business

Faculty Sponsor: Jennifer Gardner

Abstract: This project investigates the complex factors leading to the extinction of football. Recent trends reveal decreasing participation and viewership rates, concerns over injuries, and mental health issues among players. Through analysis, alternative solutions, and demographic changes, the study determines the risks involved and suggests strategies to mitigate the decline and ensure football's sustainability.

Exploring the Socio-Economic Impact of Free Public Libraries: A Comprehensive Analysis
Michaila Landa
Undergraduate
Library Informatics
School of Computing and Analytics
Informatics

Faculty Sponsor: Hailley Fargo

Abstract: This research investigates the multifaceted impact of providing free access to public libraries. Examining the socio-economic and cultural implications, the study delves into the consequences on literacy rates, community engagement, and the challenges associated with sustaining such initiatives. Through a rigorous analysis, this research aims to contribute valuable insights into the benefits and drawbacks of free public libraries, informing discussions on the role of libraries in communities.

THE COLLEGE MOVIE FESTIVAL
APRIL 18, 2 P.M.
DIGITORIUM

Undergraduate Electronic Media and Theater Students
School of Communication and Media Informatics

Faculty Sponsors: Chris Strobel and Corrie Danieley

Abstract: Each year the Cincinnati region's college media making programs have a friendly moviemaking competition. This year 16 movies were created over a monthlong process. NKU fielded four teams, primarily composed of Electronic Media and Broadcasting and Theatre and Dance students. The movies will be screened publicly, and awards given, on April 20 in the Dolby Theater at the AMC in West Chester, OH.

THE PARTICIPATING STUDENTS ARE:

EMB 424 Team A
Producer - Alyssa Lewis
Director - Anthony Gentry
Writer - William Clayton
Camera - Luke Glaser
Editor - John Hensey
Actor - Brody Wells
Actor - Annabelle Walls
Actor - Caitlin Walsh
Actor - Charlie Frank
Actor - Kennedy Durbin
Actor - Alyssa Lewis

EMB 424 Team 1
Emilee Carlton - Producer
Blayne Pugh – Director
Brody Wells – Writer
Luke "Love" Howard – Audio/Boom op.
Jennifer Long – DIT/Editor/Camera assistant
Michael Lankford – Camera/Gaffer
Actor: Braxton Bell
Actor: Kennedy Durbin
Actor: Annabelle Walls

NorseMedia
Director - Cam Hollstegge
1st AD - Zoey Desmond
Producer / DP Grip / AC - Camilo Idrobo
Writer / Asst. Producer / BTS Photography - Abby Murphy
Writer / Location Sound - Dakota Summer
PA - Abby Spears
PA - Emma Tallen
PA - Will Illes
PA - Jacob Lightner
Actor - Colin Rauch
Actor - DJ Stroud
Actor - Keenan Deaton
Actor - Jacob Lightner
Actor - Sydney Klemm
Actor - Kiley Ernst
Background Talent - Ella Rinehard

Norse Film Society
Director - Austin Jameison
Producer - Chloe Wissmann
DP - Andrew Walsh
Gaffer / Lighting - Patrick Hirsch
First Assistant Director - Blake Viox
Assistant Camera - Mason Gay
Assistant Camera - Savannah Belote
Production Sound Mixer - Cayce Daniels
Boom Operator - Andrew Bellamah
Makeup - Sydney Klemm
Script Supervisor - Aaron F. Davis
Script Supervisor - Trace 'Ace' Maloney
PA - Josey Phipps
PA - Connor Kane
Actor - Ian Kite
Elise - Corrie Danieley
Alex - Lily Hotkewicz
Funeral Attendee (Extra)- Ceci Schroer
Funeral Attendee (Extra)- Payton Simonson

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