2020 List of Presenters

Abdikadar Ali and Danielle Thaxton

College of Informatics, Computer Information Technology

Analyzing Flaws in Educational Robots for Determining Alignment With IEEE Global

The last couple of years have seen a strong movement supporting the need of having ethically aligned trustworthy artificial intelligence (AI) within intelligent system-based consumer products, including autonomous cars and robots. This global movement has led to multiple institutional recommendations towards ethical alignment and trustworthy design in AI based autonomous systems and intelligent consumer devices. The IEEE global standards on the design of ethically aligned, trustworthy AI includes a list of guideline principles in this regard. There has been prior research towards finding design flaws and vulnerabilities within various types of consumer robots. However, none of these previous works have studied whether discovering design flaws and security or privacy issues in these robots can help assess their alignment with these IEEE benchmark requirements for trustworthiness and ethical alignment. In attempt to address this gap in existing literature, we have performed a unique experimental study of two educational robots - Zümi and Cozmo. We have found specific vulnerabilities and design weaknesses in these robots within their system functionalities. Our initial research shows that these flaws can lead to hacking, injection attacks, and other robotic malfunctions that might affect the technology users negatively. We conduct a preliminary analysis of how these design flaws can be potentially non-compliant with the IEEE principles for ethically aligned, trustworthy AI. We demonstrate a novel case study of how discovery of design flaws in educational robots can assist in assessing whether their designs align with the new IEEE standards plus principles for robot ethics & trust.

The Online Celebration of Student Research and Creative Activity is sponsored by [The Institute for Student Research & Creative Activity](#) (ISRCA).

Biplov Ale

College of Arts and Sciences, Engineering Physics

Development of Augmented Reality Flashcards about Rocks and Minerals

Accessing physical specimens of various rocks and minerals outside classroom is difficult, especially for students in online classes. Augmented Reality, an emerging technology, can overcome this problem by enabling superimposition of digital information directly on real environment. The purpose of the research is not to replace physical specimens with digital models but to significantly improve Earth science education related online courses at NKU. I have developed a simple and inexpensive workflow to create 3D digital models of rocks and minerals at NKU using 2D images and Agisoft Metashape, a photogrammetry software. These rock models were then superimposed directly on real-world objects such as flashcards through AR. To perform this task, I developed a prototype mobile app, using Vuforia and Unity.

James Allen

College of Informatics - Computer Science Department, Computer Information Technology

Determining the Viability of a Rural IT Service Company

Rural businesses are historically underserved from an information technology perspective. We were interested on whether it is possible to construct a sustainable IT services company that serves primarily rural areas. We performed research to determine if a rural IT services company could be viable. To determine viability, we performed a market assessment, developed several financial models, developed a series of products, researched economic development programs, and interviewed business and government leaders. The results of this research indicate that a rural IT services company is viable and can grow to at least $2.5M in revenue within 5 years.

Devin Arnold

Integrative Studies

Eradicating Human Trafficking in the United States

In this research project I focus on the crime of human trafficking in the United States and ways the criminal justice system attempts to prevent this crime. I use my understanding of the criminal justice, organizational leadership, and psychology disciplines to research the prevalence of human trafficking in the United States. I also use these three disciplines to propose ways that may further prevent human trafficking.

Amanda Ashcraft

Arts & Sciences, Organizational Leadership

Cultural Leadership in Higher Education

If cultural competence and diversity are considered an important part of not only business, but everyday interactions, then what level of training is being made available for leadership to better perform their roles? This study explored the availability, effectiveness and frequency of diversity trainings and events offered across six campuses of a Southern, regionally accredited institution. This study also explored employees' perspective on their level of comfort, support, and preparedness to work with diverse populations of students in their role at the college.

Onesha Brown

Organizational Leadership

Unions in the Workplace: Are they Still Needed?

Unions have been in the workplace for decades to serve the purpose of delivering equality for employees. One of the main roles of the union is to work with the leadership in the organization to help resolve workplace issues. Over the years, Human Resources (HR) in the public sector has changed from a focus on developing employee hard skills (education, training) to advancing a softer skill approach including employee behaviors, commitments, and developments. Along with these changes, HR also had an increasing role in conflict management and other factors traditionally associated with unions. With HR departments in organizations evolving to meet various organizational needs, are unions less necessary? This study explores existing literature to gain a better understanding of union relevance in today's workplace.

Mary Clarke

College of Arts and Sciences, Biological sciences (CMG)

Square-Diamond Landscape Implementation

Many implementations of the square-diamond algorithm have been created to further explore this type of fractal. The square-diamond fractal can be easily visualized by starting with four points. The midpoint of the resulting square creates diamonds; the midpoints of these diamonds create squares. This is repeated for the desired number of divisions. With Dr. Steven Wilkinson, I created a new implementation for the three-dimensional representation of this fractal using Wolfram Mathematica. The "landscape" function assigns random height values to every point to form a 3D graphic.

Sydney Craddock

College of Arts and Sciences, Organizational Leadership

Implications of Cultural Norms for Women in Leadership Around the World

While women have strived to be equals in the workplace for years, it is still an ongoing battle. This is not only true in America, but in most countries around the world as well as most job fields. Women are consistently overlooked, underpaid, underrepresented, and misunderstood. To gain better insight into the specific struggles of women in the workplace a literature review was conducted to explore existing research and identify the treatment of women in the workplace and the challenges they face, and related experiences in leadership. To gain a global perspective, experiences of women leaders in North America, Asia, and Europe were explored.

Kristi Darding

Arts and Sciences, Integrative Studies

Into "The Abyss" Shedding Light on the Decline of Services for Individuals with Autism

After Transitioning Into Adult Services Over the next decade, an estimated 707,000 to 1,116,000 teens (70,700 to 111,600 each year) will enter adulthood and "age out" of school based Autism services. With more and more children receiving diagnosis and intervention therapies, we have made the grave oversight of not providing adequate supports and services for them as they grow into adults. The law requires that school districts provide additional services through the Free and Appropriate Public Education mandate of the Individuals with Disabilities Education Act. However, there is no funding expansion in place to cover these still desperately needed services at the same rate for people past age 22 who have Autism. Resources are still in high demand after these individuals with Autism reach age 22. Options in funding, services, and interventions, for this population and their families are greatly limited in both availability and appropriateness of accommodations. Services and resources have lengthy waiting lists, and unnecessarily stringent criteria for gaining access. Current programs have insufficient staffing ratios and training. This decline in services associated with transition has been shown to have long-lasting, if not permanent, devastating psychological, developmental and psychosocial effects, on many levels; not only for these individuals but our society as a whole as these individuals struggle to integrate in their communities. Our society chooses to acknowledge very little about this issue. I intend to shed light on the plight of these individuals with Autism past age 22; and their families struggles that leave them feeling as if they are falling into the abyss.

India Davis

Science, Biology

Bone Histology Analysis of Ceratopsian Dinosaur Einiosaurus Growth Curve

Paleohistology, the study of microscopic anatomy of fossil organisms, has been on the forefront of paleontological research for some time now. The microstructure of fossils lends evidence into how a dinosaur, or even a population of dinosaurs could have survived, grown, lived, and died (Chinsamy, 1995). The way the bone is formed can act as evidence for how Einiosaurus grew as they aged. Highly vascular tissue and dense osteocytes (bone cells) is evidence for rapid growth in a sample specimen and also imply an elevated metabolism (Levitt, 2013: page iv), whereas sparse vascular tissue and light osteocytes would imply slow growth. The question we were asking is 'What does the orientation and density of osteocytes and vascular canals in these limb bones tell us about the physiology of this species of dinosaur?'. Using Adobe Illustrator we were able to standardize the samples and categorize the amount of vascular canals in each specimen. This resulted in Tibia 6 and 10 showing the most rapid growth, and Tibia 14 showing the slowest growth. The results of this study do not concur with Reizner's original growth curve, and thusly further studies prove necessary.

Kelsey Donahue

College of Arts and Sciences, Biological Sciences

Phosphoenolpyruvate carboxykinase genes may play critical role in embryonic development

During development, cells in vertebrate embryos differentiate to form adult tissues and organs. Many genetic signaling pathways are used by cells to communicate and coordinate their development. If these genetic signals are disrupted, birth defects can result. We identified two genes from the pck (phosphoenolpyruvate carboxykinase) family that were potentially being expressed during embryonic development. We analyzed pck gene expression with in-situ hybridization and determined the tissue layers the pck genes were expressed in by sectioning the embryos. Our results show that pck1 and 2 are expressed in the ectoderm, a tissue that forms the skin and nervous system, suggesting that these genes may play important roles in the development of the skin. Moreover, amino acid alignments of the pck genes from multiple species were completed, identifying considerable similarities in protein domains. These results contribute to our understanding of the evolution and roles the pck genes play during embryonic development.

Olivia Eads

College of Business, General Business

The New Redlining

Though officially outlawed in 1968, the consequences of redlining policies are still felt in many communities within the United States today. An expression of systemic racism, redlining was the collusion of banks, with the guidance of the HOLC, to prohibit investment in predominantly minority areas. Many neighborhoods that were once redlined districts are being gentrified today, with renovation efforts intentionally removing and displacing nonwhite, low-income communities in order to drive in more affluent, white investors. This research seeks to prove that gentrification is a modern manifestation of redlining in its discriminatory and oppressive motivations, practices, and consequences.

Natalie Eller

with Madeline Berter, Skyler Philips

College of Informatics, Health Communication and Organizational Leadership

Developing a Mental Health Campaign for Campbell County Middle and High School Students

Suicide is one of the leading causes of death among adolescents and teens. Suicide awareness and resources needs to be addressed for youth experiencing suicidal thoughts. This fall Campbell County Drug Free Alliance reached out to our class asking us to develop such a resource for Middle and High School Students. In order to increase mental health awareness and available resources we developed a health campaign postcard. A review of current research was conducted on different awareness methods and found that abundant resources are crucial when creating a health campaign relating to mental health discussion. Understanding how the resources influence teen suicide and suicidal thoughts was relevant in lessening the stigma surrounding mental health issues. In response our postcard consisted of a main message "Be the One" followed by local and national resources for teenagers struggling with mental and emotional health concerns. Over 5,000 postcards were printed and delivered to middle and high school students throughout Campbell county.

Tiffany Falch

Mechatronics Engineering Technology

3D Printed Concrete Block with Steel Reinforcements

A few years back a 3D printer was used in the construction of a structure. This brings into play the materials that the 3D printer will use to be able to make the structure. The printer that is going to be used is of a large-scale. The 3D printer will be performing the act of making a

concrete cinder block that will have steel reinforcements. To be able to do this it will be a combination of a 3D printer and a 3D welder. The first step is to figure out the dimensions and coding that is needed to combine the two together. Once the sample fabrication of the concrete cinder block with reinforcements is made there will be test done to determine the fabrications mechanical properties. The reason for the 3D printed concrete block with reinforcements is because new research is needed for sustainable and affordable housing.

Sam Flick

College of Arts and Sciences, Integrative Studies

An Argument for Corporate Social Responsibility

Society has always had a problem with corporations failing due to fraud. Major examples are Enron, Worldcom, Theranos and Bernie Madoff. Research has shown corporations which pledge to corporate social responsibility are less likely to commit fraud. The pledge helps install a conscience within the corporation. ISO 26000 is good guideline corporations should follow. Another major reason to promote corporate social responsibility is that corporations often lay the foundation for future international laws. These laws should be developed for societies benefit not corporations. If investors chose to invest in corporations pledged to corporate social responsibility, there would be less fraud and society would be better off.

Indigo Francis

Integrative Studies

Healing the Focus

How can elementary school teachers and administrators help prevent misdiagnosis of ADHD in school-age children?

Alexus Gary

College of Arts and Sciences, Integrative Studies

The Connection Between Adolescent Suicide and Mental Illness

My presentation links the connection between adolescents suicide and mental illness.

Courtney Gatterdam

Biology (CMG)

Tropinone Synthesis with Heteroaryl Compounds to Create Aromatase Inhibitors

The synthesis of tropinone with heteroaryl compounds to create aromatase inhibitors for Breast Cancer research.

Gunnar Goepper

Integrative Studies

Strategies to Prevent Teenage Vaping

This project looks at ways to prevent teenage vaping. It views the problem through a historical and psychological lens to better identify a robust solution.

Dan Guthrie

College of Arts and Sciences, Integrative Studies

Fighting for our Democracy

Our country was founded on the basis that all citizens should have the right to vote and an equal voice. Although the United States still claims to be a democracy, a closer look at the data, shows that we are currently functioning as an oligarchy. And furthermore, evidence showing the deep divide caused by our two-party dominant political system and how the new age media has heightened that polarization highlights the fact that our national level politics are in trouble. If the United States is to save the democracy in which it was founded upon, it will need to give more autonomy to local governments, allowing local leaders who are in tune with their communities to drive policy and make decisions that meet the needs of their politically and economically diverse regions.

Bailey Hardy

With Chaise Short, Stephanie Saner, Luis Montes, Thao Tran, Bailey Kemme, Joseph Ashley, Anna Bens, Anna Vernier, Emily Brown, Jacolby Gardner, Doug Johnson, Kim Richards, Owen Sharp, KC Russell

College of Arts and Sciences, Chemistry

Phenylethyloxacalixarene Synthesis Via TBS-Protected Phenylethynylcatechols

The purpose of this work is to develop a method to synthesize annulene-o,m,o,m-oxacalix[4]arene hybrids. These molecules are expected to adopt a conformation where the

annulenes are in a close, cofacial orientation, resembling a tweezer. Once prepared, these hybrids will provide insights into the interactions between cofacial aromatic and antiaromatic systems. To develop the methodology for the synthesis of these annulene-oxacalixarene hybrids, a series p-substituted phenylethynyl-o,m,o,m-oxacalix[4]arenes is being prepared. The substituents range from strongly electron withdrawing to strongly electron donating, allowing a systematic study of the electronic nature of the phenylethynyloxacalixarenes and providing experience on how to synthesize and purify annulene compounds. This poster will discuss our progress in the preparation of the phyenyethynyloxacalixarene series.

Shelby Hart

Integrative Studies

Affordable High-Quality Music Education for All

Music education is highly underfunded and disregarded as a core academic. Social, musical, and psychological reform is needed to provide high-quality music education to all children- including those of low-income backgrounds. Studies prove the long-term effects of music complimenting core academics and the improvement it has to cognition. I will discuss the interdisciplinary approaches to solving this problem and encourage reform.

Adam Harves

Bachelor of Arts in Integrative Studies

Childhood Obesity in Low Income Households

Research shows that low-income households are more likely to be obese due to less nutrient dense food options in their restaurants, food pantries, and grocery stores. Previous studies have concluded that low SES plays a significant role in the Nations childhood obesity problem. Nutritious foods have become more expensive and less accessible over the years. While nutrient dense foods are expensive, low-cost diets are providing "more energy". The results suggest that people need to be aware of what they are donating to food pantries and grocery stores in low-income areas need to have healthier cheaper options. Childhood obesity in low-income households is important because everyone deserves to have access to healthy options

Julie Hellmann

Social Work

Opioid Abuse and Rural Community: Social Work Practice and Community Engagement

There are increasing concerns for opioid drug addiction throughout each state. Since September 1, 2019 Bracken County Health Department conducted an educational program with local first responders, including Fire/EMS/Law Enforcement/Coroner/EMA Emergency Dispatch

to provide them with information about overdose data gathering tools that are available for use, by first responders, to collect local data on near fatal/fatal overdoses in Bracken County. The purpose of the study is to provide (1) Quick Response Team training and Overdose Training for the first responders as well as (3) track data as overdose prevention strategies, education, and awareness toward areas in Bracken County with the highest near overdose numbers.

Curtis Helmer

College of Arts and Sciences, Organizational Leadership

Virtual Leadership

Leading in a virtual environment has been a growing phenomenon with the growing availability of technologies that support real-time global connections and conferencing. Never has this skill set been more important than in the year 2020 as the global economy faced a worldwide pandemic that required every organization to rethink their strategies for doing business and supporting their employees, customers, and global networks. This study explores existing literature on virtual leadership to identify key factors of effective virtual leadership and employee engagement.

Peyton Hennessy and Hanna Schmitt

College of Arts and Sciences, Mathematics

Surface Art in Mathematica

Our research seeks to produce esthetically pleasing surfaces with the software Mathematica. In our artworks, we used minimal surfaces, surfaces of least area, and tube surfaces, surfaces built around curves. These surfaces are 2-dimensional forms that lack thickness and use 2 variables in their representative equations. When adjusting the thickness, the surfaces became 3-dimensional. We used code to modify these sets of equations, which were then combined with built-in functions generating a range of results. Our results included 3D prints, movies, and graphics on Mathematica. The 3D prints helped visually display the position, in space, of the surfaces we created on a real-life scale. We used digitally generated movies to show how a minimal surface can morph into another surface by altering a parameter value. Finally, we altered parametric equations to produce an array of surfaces to show how minor changes in these equations affect the appearance of each graphic.

Christopher Hicks

College of Arts and Sciences, Integrative Studies

Dropout Rates Among Low Income Areas

What programs can be implemented to improve the dropout rate among students in low-income areas? The number of kids dropping out of high school is decreasing every year, but we can do more to keep the numbers going down. Society is failing to realize that every child is different and dealing with factors outside of school, some more than others. This is especially true in low-income areas. Some students don't have access to the same resources provided to them as other students.

Amanda Honaker

With Angela Kyntchev, Jayasree Mullaguru, Emma DeBurger, Katelyn Cough, Diarra Niang, Emma Foster, Connor Perry, Christine Curran

Biological Sciences (CMG track)

Assessing Neonatal Function in Three Genotypes of Mice Exposed to Benzo[a]pyrene

During Early Brain Development Benzo[a]pyrene (BaP) is a pollutant and a known carcinogen. Exposure from BaP can come from vehicle emissions, tobacco smoke, and grilled food. BaP exposure has been linked to learning deficits as well as delays in neurological development in both animals and humans. We used a mouse model to mimic the human genetic variation in the aryl hydrocarbon receptor and CYP1A2, which are genes related to BaP metabolism. Pregnant mice were dosed with BaP in corn oil soaked cereal or the corn oil vehicle from gestational day 10 to weaning at postnatal day 25 (P25). We tested neonatal reflexes using the righting reflex test at P5, 7 and 10. We also used the negative geotaxis test at P7, 10, and 14. We compared three genotypes of mice to determine if genetic differences affected susceptibility to BaP. We found that both treatment and genotype affected the mice's reflex performance on the tests.

Dana Jetter

Integrative Studies

How can we Change Foster Today

Due to the inadequate foster care system in Ohio reflects a systemic problem caused largely by overworked and underpaid social workers. Improving the working conditions for Social Workers who oversee foster care in Ohio will improve outcomes for the children in the system.

Tracy Kaeff

History

How Women Used Education, Access, Alternatives and Activities to Change Americans' Attitudes and Feelings About Birds

Women used education, access, alternatives, and activities to engage everyday people and change attitudes and feelings about birds. Human activities such as bird skin collecting and bird hunting for millinery purposes were having a negative impact on bird populations and hastening the extinction of several species of birds. In 1886 George Bird Grinnell started the first Audubon Society for protecting birds. This first Society folded after two years. In 1896 two women in Boston started the Massachusetts Audubon Society and as a grassroots movement of women it eventually grew into the Audubon Society we know today. The tools these women used for bird protection were education, access, alternatives, and activities. This included speaking to women's groups and school children, using everyday language instead of scientific terminology to promote understanding, promoting stylish hats without feathers, and holding bird walks. This is how women changed Americans' attitudes and feelings about birds.

Desaray Kuhlman

Organizational Leadership

The Key Functions of HRM and the impact Emotion Intelligence has on HRM

The key functions in HRM and the impact of emotional intelligence in HRM. Emotional intelligence is one of the key functions of HRM and it is one of the newer theories and there isn't much on why EI is important in a career like HRM. EI is understanding the emotions of yourself and those around you.

Zack Leffler

College of Business, Economics and Statistics

Latent Variables Associated to Hospital Efficiency

This presentation examines several latent variables, both outcome and predictor, and their association to hospital efficiency. There were an overwhelming number of variables with fewer data points, so dimension reduction techniques were used to examine these variables in a reduced sense. Several variables made up the latent variables and dimension reduction allowed for including all of our latent variables in our model. A general linear model was used to see the associations between our outcome variables and our predictor variables. Ultimately, results found that latent variable representing transactive memory were highly associated with our outcome variables representing both quality measures and team outcomes. We also found that whoever leads the shift has a significant impact on the quality measures variable. Lastly, a checklist indicator variable was also significant for quality measures.

Peter Lefkovitz

Department of Mathematics and Statistics, Mathematics and Music Composition

Melodies as Curves

The curvature function of a 2D curve describes the shape of the curve regardless of how it is moved or rotated. In music, a motif is a string of notes that appears throughout a piece, although sometimes moved up or down. The measure of curvature is a number, and we can assign each note in a motif a numerical value that describes it's distance from some fundamental frequency. Because each curve has a unique curvature function, we are able to create a unique song based on a curve, and vice versa. However, this does not easily allow for rhythm. A 3D curve has curvature and torsion, which measure how much it "bends" and how much it "twists", respectively. We can make curvature rhythm, and torsion pitch, and get a unique song based on any space curve, and vice versa.

Jenna Litzler

Integrative Studies

Funding for Early Childhood Education and its Teachers

There is still the lingering question that arises which is, is there enough funding that goes towards early childhood education programs and the educators that work with these kids and their families daily? This is the question that I want to address and have investigate further. I have researched this topic through the perspectives of my three discipline areas which are, Education, Social Work, and Organizational Leadership. My main goal for my research is for others to have a new outlook on why Early Education is so important and how taking different perspectives can help to one day solve this issue.

Sean Malley

Dr. Nilesh Dixit

College of Arts and Sciences, Geology

Transforming Geosciences Education Through Immersive Virtual Reality

With the Covid-19 pandemic, the need for easy to implement solutions to enhance online learning is paramount. With more lockdowns on the way, I have created an example of a workflow that any NKU staff could follow to create a virtual field trip or immersive 3D lecture using inexpensive and available Google Cardboard VR and YoutubeVR as well as the Vuze XR Camera.

Emily Mann

College of Arts & Sciences, Integrative studies

Research into Migrant Workers in China and the effects it is having on the children left behind.

Globalization, rapid industrialization and economic development of China, has resulted in a monumental shift from agriculture lifestyle to one of manufacturing and production. One major concern with this new trend, is that due to residency permit system called the Hukou, individuals migrating for work face immense difficulty bring their children with them. The children left behind while their parents go off in search of work, are commonly the victim of severe psychological issues such as emotional trauma, depression and anxiety. This is causing a major divide in families and causing long term issues for the children being left behind. I will be using insights from Anthropology, Social Work, Psychology and Organizational leadership, to shed light on why this ever-present complex issue needs attention to hopefully bring forth a resolution.

Aida Manzi

Organizational Leadership

Influence of Ethical Practices on Organizations Ethics help shape people's behavior.

Ethics guide us to contemplate morals and individual behaviors for society to function properly. A business cannot be successful if rules aren't in place to forbid acts like fraud and discrimination in the workplace. Managers' workplace ethics have been shown to have an effect on organizational workers. The purpose of this literature review study is to explore the relationship between the effectiveness of top administration's ethical practices on the attitude organizational workers.

Chase Maschinot and Laura Nestor

Data Science Major, College of Informatics

A Novel Multi-Faceted Approach For Analyzing Cybersecurity Educational Games

Cybersecurity educational games have the ability to meet a diverse set of educational goals for a variety of audiences. Existing literature shows that there have been several research surveys focused on analyzing cybersecurity educational games from various viewpoints. However, to our knowledge, there has been no previous work that has analyzed cybersecurity educational games in terms of their alignment with the current disciplinary benchmarks in higher education, including curricular knowledge-areas & college-level assessment, K-12 cybersecurity conceptual domains, and industry standards. In an effort to address this research gap, we used the CSEC2017 curricular guidelines, the NICE framework, the CATS project concept inventory topics, and the NSA GenCyber security-first concepts to conduct a unique analysis of a list of popular, open-source cyber educational games. Our research provides a first-of-its-kind study and novel, multi-faceted survey of these cyber-educational games that can serve as an insightful reference for cybersecurity educators and other audiences.

Vamsi Krishna Meda

College of Informatics, Computer Science

Software Engineering Product using Twitter Data

The project aims to develop a software engineering product that will allow the user to collect, store, and analyze data collected from Twitter. The focus will be on understanding the customer requirements, planning the development process, teamwork, communication, analysis, and evaluation of tasks. The project should be well verified, validated, tested, and documented.

Emma Miles

Integrative Studies

The "Non-Traditional" Student; Single Mothers Returning to College

What comes to mind when you think of a "non-traditional" college student? You may have thought of a student over the age of 25, an online student, or a student working full time while taking their courses. Non- traditional students fall into many categories which means they all have their own particular needs. Many universes offer services for non-traditional students but not all of these students receive the same benefit from these resources. A majority of non-traditional college students are single mothers returning to finish their degree. As a single mother, adding a college schedule to their daily lives can put a toll on these women physically, emotionally, and financially. I will discuss a complex problem that has arisen in contemporary society and is worthy of more aggressive attention by the public, policymakers, and government. Single mothers returning to college are unique, non-traditional students working full or part time to care for their families so campuses should be encouraging, offer specialized financial support, and provide personal services equal to the increasing cost of college tuition. My research of these women of childbearing age 25 – 35, reveals they are returning to college only to discover that many of their needs are left unserved or completely unmet. Traditional campuses focus on the traditional student such as those coming directly from high school

focusing on everything from dormitories to sororities. Single fathers and married adults with and without children don't face the same pressure when returning to school. Single mothers need financial services, counseling and childcare during hours that fit their schedules as well as private spaces for personal needs such as nursing. As a single mother, making sure the needs of their family are met while returning to college can take a toll on these women's health and mental wellbeing because anxiety, fear of failure and exhaustion are often a problem. A campus that has a special outreach program for single mothers would provide the safety net these women need and encourage them to pursue completion of their secondary education.

Bethany Mitchell

Arts & Sciences, Integrative Studies

Healthcare Discrimination Generates Mistrust in African Americans

African Americans suffer disproportionately, from a list of health disparities such as diabetes and heart disease. The history of healthcare experienced by the African American community has, overtime, left an overwhelming sense of anguish due to unfair treatment and discrimination. Consequently, African Americans have developed a grievous level of distrust with the United States Healthcare System. Can African Americans overcome health disparities in a system that enabled them? I will use this research to convey how discriminatory incidents experienced by African Americans' have consequently caused mistrust in the United States healthcare system. I will approach my research to expose the disproportionate health disparities in African Americans, dive into the history of mistreatment, and highlight discrimination in healthcare education. Then, transitioning into research highlighting mistrust in African Americans throughout different facets of healthcare. Acknowledging the problem opens the invitation to solutions that can mend the bridge of mistrust between an impactful population of people and the United States healthcare system.

Jordan Monroe

Mentor: Joe Nolan

Mathematics, Mathematics and Statistics

Leg Mobility and Pain

A look at the statistical techniques used for a project for Dr. Noyes

Luis Montes X

with Courtney Gatterdam, Jasmine Trejo, Donald Williams and Lili Ma

Biology

Synthesis of heteroaryl molecules I80-H11 through a palladium-catalyzed heteroarylation

The purpose of this work is to study Heteroaryl molecules such as I80-H11 and I80-H37. The structure of this molecule includes a heterocyclic halide and a tropinone scaffold synthesized using Robinson's one-pot, domino synthetic route. We used microwave-assisted, palladium-catalyzed direct α-heteroarylation of ketones to synthesize this derivative of the tropinone molecule followed by methods of MPLC, NMR, and computer modeling to purify, identify, and evaluate our compound. Our research will expand the scope to better synthesize heteroaryl compounds, provide insight to the roles of palladium catalyst in reactions, and practice of green chemistry which is key to have lower levels of chemical use and chemical waste. Also, aid the development of projects such as CURE and UROCC that implement researched focused approach on organic chemistry courses.

Fairley Neal

Integrative Studies

Animal Welfare and Humanitarianism

Animals are used for agriculture, clothing, food, and entertainment, to name only a few ways they are used or exploited. Animal agriculture, for instance, accounts for at least 51% of worldwide Green House Gases. This also results in mass deforestation in order to provide more farmland to feed these animals, destroying and displacing other habitats and animals, as well as creating myriad health issues including disease and famine. This can result in species that are already endangered facing further threat. I will research and provide evidence of these claims while also proposing ethical and sustainable solutions. This is a global issue that can be faced locally with regard to issues such as food security and health and I feel it is every global citizen's responsibility to take necessary steps to preserve the future of the planet, animal species, and humanity itself.

An Ngo

Computer Science

FRUIT RECOGNITION USING MACHINE LEARNING

Object recognition is really helpful in detecting objects, such as human, cars, buildings… in an image or a video. In this research, we use some machine learning techniques to recognize different kinds of fruits in an image. This research requires software platforms (Python 3, Pycharm, Anaconda) and libraries in Python (numpy, panda, scikit-learn…) for coding part. After taking 30 photos of five common fruits (apple, orange, banana, grape, strawberry), we use Selective Search Algorithm to locate potential objects in those images by drawing bounding boxes. To better capture the characteristics of different fruits, we employ the Histogram of Oriented Gradients (HOG) feature to represent each potential fruit object. This feature is used to train a Support Vector Machine (SVM) model to classify those bounding boxes into different

categories. This fruit recognition system works well on most of the collected images. However, the system recognition accuracy decreased to recognize some similar fruits, like apple and strawberry. The reason for this is that these fruits share similar color and shape information. For the future, we will improve recognition accuracy by using other machine learning or deep learning models. It is also possible for us to build a phone application to help people recognize different fruits in the real world.

Samantha O'Daniel

Organizational Leadership

Transformational Leadership for a Psychologically Safe Work Environment

A psychologically safe work environment is an environment that promotes the feeling of being valued as an organizational team member without fear of judgement or consequences for contributions in the workplace. Based on the information provided from this literature review, one can conclude that transformational leadership, if done correctly, can promote a psychologically safe work environment. The empathy and compassion modeled in transformational leadership creates a better work environment and is one component to a healthy and productive workplace where employees feel valued. Both the leaders and followers in the working environment need to feel that there is equality regarding the power dynamic. Transformational leadership benefits both managers and workers because of the psychologically safe environment in which the employees feel more comfortable asking for help, inquiring about the company, and sharing ideas, which ultimately benefits both the employees and the organization.

Herbert Osborne

College of Arts and Sciences, Organizational Leadership

The Relationship between Authentic Leadership and Emotional Intelligence

Authentic leaders lead with purpose, meaning, and values, leveraging their natural abilities with an awareness of their shortcomings. Research has shown that people are more likely to follow an authentic leader because they trust them and know exactly where the leader stands on issues. With the evident value of this leadership approach, it is worthwhile to examine the characteristics that promote authentic leadership practices. One such characteristic is emotional intelligence. Using a systemic literature review, this paper explores existing research on emotional intelligence and authentic leadership to explore and identify connections, if any, exist between the two.

Tyron Owsley

Integrative Studies with Focus Areas in Communication, Psychology, and Religion

Examining and addressing racial profiling of African Americans by members of the law enforcement

An Integrative Approach Racial profiling of African Americans by members of the law enforcement is a complex issue that has been instilled in society since the beginning of the development of America. The theme that racial profiling tends to portray is keeping Black individuals in their place. Examining and addressing this problematic issue within the law enforcement will allow for officers to become aware of their own implicit biases towards members of the Black community while simultaneously establishing ways in which one can abolish racial prejudices from their culture. Doing so will also allow for Black individuals to become aware of their own implicit biases towards officers of the law. If the law enforcement is to operate on more just terms, it is imperative that we initiate more intercultural communication to reinforce the idea that while cultures may be diverse, we have more commonalities than we may be aware of. Through establishment of common ground between the disciplines of Communication and Psychology, the analyzation and implementation of various training new training techniques and polices will help bring about the demise of this complex issue we see playing out within the U.S. law enforcement system.

Mariah Patton

Integrative Studies with a focus on: Psychology, Social Work, Human Services of Addictions

How Can Vaping Intervention Be Beneficial in Schools?

This focuses on the need for vaping intervention programs among teens in schools.

Connor Perry

with Diarra Niang; Emma Foster; Katelyn Clough; Jayasree Mullaguru; Emma DeBurger; Kayla Jenkins; Victoria Ferguson; Tyler Forrest; Christine Perdan Curran

College of Arts and Sciences, Biological Sciences

Assessing Adult Motor Function in Three Genotypes of Mice Exposed to Benzo[a]Pyrene During Early Brain Development

Benzo[a]pyrene (BaP) is a carcinogenic polycyclic aromatic hydrocarbon commonly found in traffic-related air pollution, tobacco smoke, and grilled foods. BaP is linked to learning deficits and to neurodevelopmental delays in human and animal studies. We are using a mouse model to determine if genetic differences increase susceptibility to BaP exposure during early brain development. Mice lacking the CYP1A2 metabolic enzyme and wild type control mice were exposed to BaP from gestational day 10 (GD10) through weaning at postnatal day 25 (P25). A battery of motor function tests were performed when the mice reached young adulthood (P60). We used a pole climb test and rotarod to assess motor function and motor learning. There was a significant main effect of genotype with the time to turn ($P < 0.001$) and the total time to descend the pole ($P < 0.01$). In the rotarod test, there was also a main effect of genotype with AhrbCyp1a2(-/-) knockout mice showing impaired performance on Days 1, 2 and 5 of the test. This suggests that early life BaP exposure has minimal effect on motor function in adults.

Nga Phan

College of Informatics, Computer Science, Data Science

Emotional Recognition using Convolutional Neuron Network

Human emotion recognition plays an important role in many settings, such as the value of the quality of a meeting, the real satisfy level of customers toward a product, or even future robots with the same emotional abilities as humans. In this project, we are focusing on leveraging an emotion recognition system to collect feedback information to improve online learning efficiency. As the goal of the preliminary work for the research, the goal of this work is to verify the effectiveness of the convolutional neural network (CNN) in recognizing different facial emotions.

Therefore different CNN architectures are analyzed and compared to help us find the best CNN architecture for facial emotion recognition.

Leah Poe

College of Arts and Sciences, Integrative studies

Disproportionate Incarceration of Communities of Color

In 2010, the ACLU found that black Americans were 3.73 times more likely to be arrested for marijuana possession than white Americans. What makes this statistic more striking is that marijuana usage is about the same between black and white Americans (ACLU). Black Americans are incarcerated at a rate of more than five times that of white Americans (NAACP). This project explores the connection between racial profiling and the disproportionate incarceration of black Americans and proposes how significant changes to law enforcement in the United States can foster a more just and equal penal system. I propose attainable changes that can be implemented with our law enforcement to lessen the disparities experienced by communities of color who are disproportionately affected by mass incarceration.

Morgan Purcell

Integrative Studies

Child Abuse and Healing through Art Therapy

Child abuse continues to be a prevalent problem in the United States, so therapeutic treatments and interventions are necessary for healing and recovery to occur. Research shows that child maltreatment and abuse can lead to many issues later in life for those who have been abused, and art therapy has proven to be an effective and useful method to treat traumatized and abused children.

Logan Rieman

College of Arts and Science, Interdisciplinary Studies

Benefits of Green Buildings

Hi my name is Logan Rieman and I have done my project and research on the sustainable green buildings and construction. I have chosen this topic because I have worked in a handful of different jobs that were all in the construction industry and I also plan to own a excavation/construction company in the future. This topic means a lot to me because it is focused on how the construction industry can really do its part by having less of an impact on our environment.

Bijay Rimal

with Rachael Lerch, Jack Shannon

College of Arts and Sciences, Mathematics

A variation of Cops and Robbers on Graphs

We consider a variation of game of cops and robber where the cop seeks to determine the location of the robber by selecting a vertex v in the graph and receiving distance from v to the invisible robber. The movement of robber is restricted to adjacent vertices except for the vertices just probed by the cop. We use multiple probes per turn for the cop to determine strategies to locate the robber in the Grötzsch graph, the Petersen graph, and split graphs and conclude that it takes at most 3 turns to locate the robber in Grötzsch graph and the Petersen graph. We also provide strategies to locate robber on different split graphs.

Elizabeth Rowe

Integrative Studies

A Child's Call for Help: The Need for Mental Health Intervention in Public Schools

Through the disciplines of psychology, social work, and education, I will provide research that supports the need for implementation of mental health programs in public school settings; I will also provide solutions that will allow for these programs to be implemented into the school day. Because of the occurrence of bullying on school property, as well as the convenience, supports that the mental health programming is a responsibility of the public school district; Through allocating a budget for mental health programs, school districts are able to provide students with the services they need.

Emily Schiller

College of Arts and Sciences, Organizational Leadership

Futuristic Focus and the Role of Visionary Leadership

Visionary leadership can be defined as the communication of a future image of a collective with the intention to persuade others to contribute to its realization through mobilizing and motivating followers (Knippenberg, 2014). This paper explores current literature regarding characteristics that a visionary leader must encompass to have a mobilizing and motivating effect on their followers. With a focus on instances where the five most prevalent characteristics of these leaders are interpreted, discussion also explores the impact that this style of leadership has on organizational units. The paper not only addresses the defining components of being a visionary leader but the impact that these elements can have on the future goals and implementation of those goals for teams within organizations.

Samuel Seibert

with Michael P. Guy

College of Arts and Sciences, A.C.S General Chemistry Track

Anticodon Loop Modifications Enhance Oxidative Stress Recovery in Yeast

Across eukaryotic organisms, 2`-O methylations on the anticodon loops of tRNA molecules are widely conserved and crucial for efficient translation. The methyltransferase Trm7 interacts with the protein Trm732 to methylate nucleotide C32 and interacts with the protein Trm734 to methylate nucleotide G34 on tRNA phenylalanine. Yeast cells lacking both modifications are sick, but the presence of either modification causes a healthy phenotype. Oxidative stress caused by free radicals stimulates metabolic responses which upregulate the transcription of stress recovery genes. Previous research indicates that trm7Δ mutants and trm734Δ mutants have lowered resistance to oxidative stress. In this study, trm732Δ, trm734Δ and trm7Δ mutants showed lowered, yet comparable levels of oxidative stress resistance.

Elizabeth Siry

College of Arts and Sciences, Integrative Studies

The Importance of the Early Childhood Years: Research into the Effects on Our Futures

According to a study done on childhood trauma by The National Survey of Children's Health, about half of the nation's children, over 32 million, have experienced at least one traumatic event. My research offers an explanation of what the education, social work, and leadership disciplines can offer when exploring childhood trauma and it's lifelong effects. My research also explains the importance of unifying the knowledge gathered by the various disciplines.

Susan Smith

College of Arts and Science, Organizational Leadership

Challenges of Multi-Generational Workforce

Multigenerational workforce is a reality in today's employment. The composition of the workforce has shifted from heavily Baby Boomers to primarily Millennials between 2010 and present day, however the older generations are remaining in the workforce as well, not necessarily being replace. This change in dynamics presents many challenges for the leaders of today as the expectations and motivators from one generation to the next tend to differ greatly. Existing research delves into the differences and why they exist, and it begins to answer some of the questions leaders have. Leaders must find the methods and leadership styles that will encourage, engage, and motivate workers from all generations. These questions are explored, and suggestions made for the most effective methods of encouraging them to learn from each other.

Sara Steffen

with Tyler Downnen and Mark E. Bardgett

Arts and Sciences

Neuroscience Effects of Developmental and Adult Antipsychotic Administration on Dendritic Structure in the Nucleus Accumbens

Antipsychotic drugs are given to children to alleviate various psychiatric disorders even though there is little research on the impacts on brain development and behavior. This study explored the effects of the antipsychotic drug, risperidone, on dendritic architecture in the nucleus accumbens in rats during adolescence and adulthood. Rats were administered either vehicle or risperidone (3.0 mg/kg) from day 14 to day 42, or day 77 to day 105. These ages respectively correspond to early childhood and young adulthood. Although the data are preliminary, we have not observed significant differences in dendritic structure between rats administered risperidone during development or adulthood. Future research may explore different measures of dendritic

architecture such as dendritic spine analysis in other brain regions to better understand the effects of antipsychotic drugs on neuronal structure.

Angela Steward

College of Arts & Sciences, Integrative Studies

Lack of Professional Caregivers in an Aging Society

Lack of professional caregivers in an aging nation with extensive health issues is a problem in society. To address this growing concern, the medical community and social workers need to provide a health care curriculum based on the needs of the elderly and make the education accessible to informal caregivers.

Jasmine Trejo

with Donald Williams, Courtney Gatterdam, Luis Montes, Lili Ma

Biology Undergraduate Research in Organic Chemistry (UROCC)

Practices for a Novel Approach to Enrich Learning Experiences A pedagogical review of the novel UROCC program at NKU.

Cameron Tuley

Integrative Studies

Don't Weight on Change

The issues of childhood obesity for kids in poverty Childhood obesity is an issue that can lead to many life threating diseases to children as the enter young adult hood such as type 2 diabetes and heart disease. Children who are in poverty have increased chances of becoming obese due to many economic factors. The focus of this research is to develop a set of solutions that will work towards decreasing the growing rate of childhood obesity. Through the use of many different research articles there are three main focuses that need to be reworked in order to help increase the chance for children in poverty to not become effected by obesity. Food stamps, physical education programs fast food price points and nutritional makeup are three factors that show correlation with childhood obesity. The analysis of this set of research data concludes that there needs to be new proposed solutions to food stamps, physical education, and fast food.

Teresa Walker

College of Arts and Science, Integrated Studies

Wealth over hunger

1. My motivation for my research paper was to see why so many people go hungry in a country that perceives to be wealthy.

2. I am trying to figure out why people cannot afford to eat. Throughout the year they seem to struggle with putting healthy food on the table

3. I looked at cities that at one time succeeded and then failed. How government policies effect how people put food on the table.

4. One solution to solve the problem of hunger is to raise minimum wage to $15.00 dollars an hour.

5. In the United States where people live in luxury, the people who are unable to put food on the table, stand in charity lines, or on the corner with signs. Please help, I am homeless and hungry. Policies and charities that are set up to help the hungry do not always help, but they can hurt, everyone thinks that charities that are set up to feed the hungry is the answer. but the fact of the matter is if minimum wage were higher, we would not need the charity or government assistance. People do not want handouts; they just want an equal opportunity to support themselves and their families.

Donald Williams

with Jasmine Trejo

Arts and Sciences, Biology

Synthesis of alpha-heteroaryl Compounds via Palladium Catalysis in Course-based Undergraduate Research Experience (CURE) Organic Lab Heteroaryl compounds are common and important components in medicinal chemistry. A palladium catalyzed α-heteroarylation of the compound tropinone under microwave irradiation was conducted in our lab. In this presentation, the palladium catalysis was utilized to synthesize α-heteroaryl compounds. The optimized reaction conditions are 1.1 equivalents of tropinone, 1 equivalent of heteroaryl halide, 2.4 equivalents of NaOtBu. 2mol% of XPhos Pd, in a 2mL toluene solution under microwave irradiation for 20 minutes at 1500 C. This study provided data and information for the development and manufacture of new heteroaryl compounds as cancer treatment candidates.

Angel Wilson

College of Arts and Science, Integrative Studies

Empowering At-Risk Females

Kamala Harris, the daughter of two-parent immigrants made history as American first Vice President-elect empowered women everywhere. Kamala's spoke to women's strength everywhere and their struggle who, despite the odds against them, contributes much of their lives to equal justice for all. She specifically gave honor to "Black women within American democracy as being those who are too often overlooked, but so often prove that they are the backbone of our democracy" Kamala 2020. Her victory has thus proven that with hard work and determination, we, the women of today's world, can change the face of tomorrow's direction. How can Society help to facilitate empowerment that will impact the lives of at-risk females? We can promote change by deepening our understanding of the focus area of Integrative Studies Psychology, Human Services, and Religion Studies, which separately lay the foundation of knowledge concerning the complex problem, but corporately brings a balance that promotes change.