IU KOKOMO

STUDENT

RESEARCH

SYMPOSIUM

MARCH 25, 2022

IU Kokomo Student Research Symposium 2022

Symposium Schedule		
Event	**Location**	**Time**
Registration/Poster Check-in	Alumni Hall	8:30 a.m.-12 p.m.
Learning in the Sciences: Studying Stars, Software Design, and Healthcare	KC 130	9-10:15 a.m.
Using Research to Support Families and Communities	KC 130	10:30-11:45 a.m.
Welcome from Vice Chancellor for Academic Affairs Mark Canada Poster Session: Research Highlights Across the University	Alumni Hall	12-1:15 p.m.
Learning in the Humanities	KC 130	1:30-2:45 p.m.
Discovering Tomorrow's Teachers	KC 130	3-4:15 p.m.

Top poster and presentation awards will be announced via email following the symposium.

Special thanks to our faculty volunteers: Awny Alnusair, Scott Blackwell, Angela Coppola, Chris Darr, Joann Kaiser, Hisako Masuda, Stephanie Medley-Rath, Leah Nellis, Aaron Pickens, and Esra Topcuoglu.

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Learning in the Sciences: Studying Stars, Software Design, and Healthcare

Presentation Session – 9-10:15 a.m.

Project Title	Presenter	Faculty Mentor	Abstract
Numerical Simulations of Double White Dwarf Mergers	**Tifany Burnett**	Patrick Motl	We investigate the energy input from the nuclear reactions initiated during the merger of double white dwarf stars, the progenitor of R Coronae Borealis stars. Previous work has indicated that conditions reached during the merger would allow residual hydrogen to fuse and initiate the triple alpha process. The simplified nuclear reaction network includes fusion of hydrogen, helium, and alpha capture processes. Our initial simulation is of a double white dwarf with an initial mass ratio of 0.5 and the simulations are conducted with the Flow-er code. We track the identity species of hydrogen, helium, carbon, and oxygen through passive scalar fields to identify the flows of the processed material. Three simulations are conducted with the same initial data. Of these we have our control which does not include nuclear reactions, a simulation that only includes fusion of remnant hydrogen, and our full network simulation.
The Impact of Substance Use and Addictive Disorders on Nurses	**Kelsey Burnham**	Sonya Green	This research project dives into what substance use and addictive disorders are, what puts people at risk for them, specifically genetics and ACE scores, as well as how these disorders directly impact those who are nurses and/or deciding to go into nursing and other professions in the medical field. I also touch on ways future nurses like myself, as well as established nurses, can combat these risk factors and decrease the impact they can make.
The Influences of Auditory Stimuli on Physical Activity in Adults Aged 19-44: A Systematic Review	**Noah Claus & Audrey Strawsma**	Ghadah Alshuwaiyer	This systematic review examines the effects of auditory stimuli on physical activity in adults. This systematic review used eight electronic databases with 22 articles that fit the inclusion and exclusion criteria parameters. We found that auditory stimuli generally positively affected physical activity and can assist with fitness/performance markers, physically and mentally. Five studies that involved enjoyment indicated positive effects of music during exercise. Participants who partook in physical activity were more likely to elicit positive responses towards the activity with music than those not allocated music. Additional research is needed to determine whether auditory stimuli will improve other physiological aspects such as heart rate, rate of perceived exertion, strength, and endurance.
Identifying Bad Software Design using Semantic Techniques	**Wesley Grove**	Awny Alnusair	Well-written software is consistently easier for programmers to understand, maintain, and reuse. In this research, we propose a reverse-engineering approach that intends to automatically scan the source-code and identify bad design practices. Specifically, our goal is to help programmers identify anti-patterns in their code. To achieve our goal, we use ontological formalism and Semantic Web technologies to represent the conceptual knowledge of the source code and semantic rules to capture the structures and behaviors of the anti-patterns in the source code. The parser that scans the source-code of a software library and represents the code as a model in ontologies has been developed.

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Early Detection of Fake News Spreaders on Social Media	**Tao Wang**	Yang Liu	The fast and massive spread of fake news on social media can cause significant social harm. Various fake news detection approaches have been proposed in the literature to address this problem. The limitation of fake news detection is that it can only detect fake news after it has been spread because it requires data in the news spreading process to make a detection. However, detecting fake news spreaders, especially early before they start to spread fake news can prevent fake news from spreading far more effectively thus is more important. To address this problem, we propose a novel machine learning-based approach to detect fake news spreaders on social media based on the modelling of their user timelines. Each user timeline is modelled as a sequence of tweets. Each tweet is modelled as a sequence of words. Then, a hierarchical transformer model is built upon the sequential representation of timelines and tweets, which predicts the probability of a user being a fake news spreader. The model is evaluated on a large-scale dataset FakeNewsNet, including a collection of over two million Twitter users.

Using Research to Support Families and Communities

Presentation Session – 10:30-11:45 a.m.

Project Title	Presenter	Faculty Mentor	Abstract
Family-Friendly Policies: Supporting American Working Families in the Workplace	**Paola Cubides**	Rod Haywood	The goal of this research is to examine in depth the existent Family and Leave Act, its issues and challenges, as well as the real struggles that American families face when welcoming a new baby. I also highlight companies that are making a change and emphasize the importance of implementing family-friendly policies that support mothers and fathers. In the end, I suggest a proposal that I consider necessary to improve the Family and Leave Act, and overall to guarantee the well-being of American working families.
Needs-Based Humanitarian Problem-Solving and Coordination at the Local Level	**Brenton Davisson**	Andy Tuholski	An analysis of the existing local humanitarian support structure and needs of the community was conducted through available data, arranging interviews with appropriate Kokomo stakeholders, and completing a peer city comparison research study. Gaps in coverage and communication were identified; findings include key takeaways and actionable recommendations.
Exploring Stress Related Healthcare Services of Caregivers of Children with Disabilities	**Megan Dishon**	Angela Coppola	Caregivers of children with disabilities face numerous stressful challenges and often do not know what services are available to them. I interviewed three mothers who are primary caregivers of children with disabilities ages 17-20. The purpose of this project is to present to the public, along with health care advisors, about the improvement of overall healthcare services to not only support the child with the disabilities but the caregiver and family as well.

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Community Supervision Within Risk Assessments: An Indispensable Roadmap for Classifying Offenders	**Hayden Herring**	Beau Shine	My research looks at risk assessments and how they are used as the foundation of offender case management. First, I describe the purpose of this tool and how risk assessments are used to assist correctional practitioners in achieving the ultimate goal of a safe community, lower recidivism rates, and higher levels of rehabilitation. I explore the history of risk assessments and how they have evolved. Next, I address challenges that surface with these assessments and how they can be improved. Following that, I argue that these assessments are effective and valid. I end my research urging the corrections system to integrate community supervision within case management.

Research Highlights Across the University

Poster Session – 12-1:30 p.m.

Project Title	Presenter	Faculty Mentor	Abstract
The Effects of Standards-Based Grading on Student Achievement	**Carter Adkins**	Randy McCracken	This study explored the effectiveness of standards-based grading on student achievement in Indiana school districts that implemented standards-based grading practices. The study includes all 289 districts identified by the National Center for Education Statistics. A causal research design was used to identify the relationship between implementing standards-based grading and student achievement data. Student achievement data was collected from the Indiana Department of Education during the 2018-2019 school year. Student achievement data was based on the Indiana ILEARN test. SBG school districts were determined to be above, at, or below the state average for ILEARN test results and this was used as the determinant of whether SBG practices put forth high achievement scores. Results suggested there was no relationship between student achievement and SBG practices.
Child Abuse Effects on Interpersonal Relationships and Attachment Styles	**MiKayla Beard**	Kathryn Holcomb	The study is to explore how child abuse can relate to a person's adult relationships and attachment style. I hypothesized that those who were abused as a child would have a dismissive-avoidant attachment style. I also hypothesized that they would be reluctant to be open with their emotions to their friends and their partners. This study will include 50 participants recruited off of the social media platform Tiktok. The survey is a short version of the interpersonal relationship questionnaire (ISQ) and the Attachment style questionnaire (ASQ). The results of the study are intended to help friends and partners of child abuse survivors better understand them and hopefully better their relationship.

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How Twitter Sentiment Relates to COVID-19 Vaccination Rates	**Katie Boike, Adam Basham & Austin Carie**	Hong Liu	Since 2020, COVID-19 vaccines have been developed, as well as booster doses, to prevent as many infections and deaths as possible. However, there are many people who refuse to get vaccinated. This work aims to study the connection between the public sentiment of vaccines and the rate of vaccinations. Using Twitter, Google Trends, and vaccination data, sentiment analysis algorithms and correlation algorithms will be used to see if there is a connection between them. If we can find a relationship, this work might be able to convince more people to get vaccinated.
Interpretation of Movie Theater Consumers' Perceptions: Race, Age, & Gender Effects	**Christian Bunce**	Julie Brunson	This study aimed to find perceptual differences in movie theater decisions regarding age. To evaluate this, I used vignettes with questions following to measure whether age was a true indicator of how much someone is willing to spend at movie theater concessions and how likely they are to choose an action movie over another genre. The vignettes and questions were published to Amazon's Mechanical Turk and participants shared their perceptions regarding this topic. In all, a statistical review of my data collected indicate that only one of my hypotheses were supported. Younger individuals were perceived to be more likely to choose an action movie over another genre of movie. There was no difference found between the perceived amount younger or older individuals would pay at movie theater concessions.
Finding the Accuracy of 5 Star Ratings on Amazon Product Reviews	**Kyle Copenhaver, Daniel Parvin II, Alex Whiteman & Pat Mills**	Hong Liu	When writing reviews some people will give inaccurate star ratings based off of what they wrote in their text review. Our research looks to find how accurate people are at giving a 5 star rating. This research is important to the online industry because many people solely use the star ratings to influence their purchases. Verifying that the star rating is accurate will help ensure the buyer knows what they are actually buying. Our goal is to provide a method to filter out inaccurate reviews. We are assigning a standard range for each star rating, and comparing based on the polarity of the review to get a percentage of accuracy for each review compared to the star rating. To get the polarity we are using various sentiment analysis algorithms. To test this we are using a dataset that contains over 568,000 Amazon reviews, and we are taking a random sample from the dataset.
Bloom	**Brittany Lucas**	Erik Deerly & Anita Garza	My creative work is a handmade book collecting works of poetry exploring my personal experience living with a chronic condition, the process of going through pelvic floor rehab to treat my condition, and how my condition has impacted certain parts of my life. This has been a lifelong ailment for me and I am still not through with figuring out how to manage it fully. By exploring my feelings through the poetry, it will help me process the experience and get through to the end of the treatment process. This project will also allow me to put my strongest skills that I have developed in college, bookbinding and poetry, in the spotlight.

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My Bookbinding Artists' Books	**Marlene Regalado Alanis**	Erik Deerly & Anita Garza	I will be presenting a total of ten books I created, divided into three different categories. I will be presenting 3 single-section case-bound books, 2 tunnel books, 1 casebound accordion book, 1 concertina book, 1 double pamphlet, 1 pamphlet stick book, and 1 simple accordion book with papercuts. One category is nature-based, another category relates to the Hispanic/Latino community, and then I have one book that doesn't fit into any of these categories. My poster will demonstrate the slightly different processes I took to complete that specific book. I will also showcase another artwork I recently did for my drawing class. Its content is also nature-based and I used chalk pastels to create this piece.
The Relationship Between Temperature and Body Mass on Carbon Dioxide Production in Crickets	**Andrew Pervez & Marcus Mensah**	Michael Finkler	Rate of metabolism is affected by many factors including body size, physical activity, and environmental temperatures. Several studies have been conducted on the effects of temperature on metabolic rate. Metabolic rate has been shown to increase exponentially with temperature, with a scaling value of ¾ the body mass in the organism. In this experiment, metabolic rate was observed through the production of CO_2 in House crickets (Acheta domesticus). To accurately analyze the effects of temperature on CO_2 output, crickets of a small, medium, and large size were selected for this experiment. The crickets were acclimated to temperatures of 10℃, 20℃, and 30 ℃. We expected the larger crickets to produce more CO_2 in the warmer temperature. Our hypothesis was supported by our graph and data analysis but further research is needed to explore the relationship between CO_2 production and body size.
Domestic Abuse: The Types, Signs, Programs, and Facts	**Chloe Sessoms**	Emily Faulkner	My presentation describes different types of domestic abuse as most individuals are only aware of physical abuse rather than mental or financial, as well as the signs that go along with these forms of abuse. In addition, I list some of the available resources for those who know someone in danger or who is in danger themselves. Finally, I address ways a person can help to fight against domestic violence in their community to help others and raise awareness of the issue.
Development of Assay to Study Nylon 11 Biodegradation Pathway by Soil Bacteria	**Logan Smith**	Hisako Masuda	Nylon 11 is a polyamide plastic with broad industrial applications from automotive components to consumer textiles. Despite being a bioplastic, synthesized from biological material (11-aminoundecanoic acid), it is not currently considered biodegradable. Our lab has recently isolated a bacterial strain, Pseudomonas aeruginosa strain JG-B from nylon 11 enrichment culture. This strain is capable of growing on 11-aminoundecanoic acid as a sole source of carbon, nitrogen, and energy. The results suggests that the first step of nylon 11 is depolymerization to its monomeric form (11-aminoundecanoic acid). As a part of our efforts to elucidate the metabolic pathway of nylon 11 degradation, we are currently in the process of developing a sensitive, inexpensive quantitative assay to measure depolymerization reactions. The methods include physical separation of monomer from polymers, followed by the detection of primary amine. This presentation will discuss our progress in developing a method of quantification.

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Prediction of Stock Prices Based on Search Trends during the COVID-19 Pandemic	**Ariel Stevens, Tao Wang, Jesus Martinez & Tyler Marcum**	Hong Liu	In today's world, the financial industry increasingly involves technology and data science, and the prediction of the stock market has been an active area of research for a long time. This project aims to study the connection between the public stock interest/sentiment of a company and the value of its stocks. Since the outbreak of the COVID-19 pandemic in 2020, it has played a major role in the stock markets and their analysis. By using data from Yahoo Finance and Google Trends data captured in the time frame from Jan 1, 2020, to Dec 31, 2020, machine learning algorithms will be utilized to see if accurate price prediction of stocks can be made. This project has the potential to allow for smarter stock trading and better outcomes when individuals maximize their investment portfolios.
Effects of Past Growth Conditions on the Length of Growth Arrest Induced by HipA toxin of hipBA Toxin-Antitoxin system in Escherichia coli	**Olivia Terry**	Hisako Masuda	Actively growing populations of bacteria harbor a subpopulation of dormant cells, called persisters. Persisters are insensitive to the action of antibiotics and other stresses. Once the stressor is removed, the cells resume growth. Persister cells are of clinical importance, as these cells are responsible for recurring infections. Toxin-Antitoxin (TA) systems are postulated to be important for persister cell formation. HipA is a toxin encoded from hipBA TA system in Escherichia coli genome. HipA is a kinase with one known target, Glu-tRNA-ligase. Upon phosphorylation, Glu-tRNA-ligase loses activity, which in turn increases the uncharged tRNA and halts translation. Ectopic expression of HipA induces reversible growth arrest in E. coli. After a defined period of time, these dormant cells resume growth. Previously, our lab has shown that the length of growth arrest is impacted by previous growth conditions, including past HipA expression and recovery. We are currently investigating the molecular mechanism of differential response to HipA-induced toxicity, including the change in transcriptional regulation and DNA methylation.

Learning in the Humanities: Analysis, Sound, and Creativity

Presentation Session – 1:30-2:45 p.m.

Project Title	Presenter	Faculty Mentor	Abstract
What Are You Afraid Of? Analyzing American Horror Culture Through the Lens of Southern Gothic Literature	**Skylar Anthony**	Jim Coby	I completed an essay analyzing William Faulkner's "A Rose for Emily," specifically the horrors we see in this southern gothic piece including Emily's fear of social isolation and her fear of letting go of the past, as she refuses to let go of a man trying to leave her and thus poisons him and keeps his body in her home. The essay also incorporates Jeffrey Jerome Cohen's essay "Monster Culture (Seven Theses)" to further explain why exactly her behaviors deem her a "monster" to her society.

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Frozen Breaths, Stolen Time	**Savannah Cooper**	Karla Stouse	"Frozen Breaths, Stolen Time" is a creative writing project of roughly 2,000 words that I completed for my ENG-W 301 Advanced Creative Writing class. It's a speculative short story about an 18-year-old girl named Etta Haytham who runs away from home to meet up with her questionable boyfriend. However, an accident on an icy road leaves her alone, stranded, and questioning everything. As reality begins to shift around her and the cold sets in, Etta encounters a mysterious being that will force her to confront how little she knows and what she is willing to give up in order to survive.
Fantasy Theme Analysis of The Joker	**Haley Freeland**	Chris Darr	I will be presenting a Fantasy Theme Analysis of the movie *The Joker*. In this analysis I will present an oral report of each theme found within the film as it relates to Fantasy Theme Analysis. This will include the setting theme, character theme, action theme and then the overall rhetorical vision.
Holodomor: Soviet Genocide in Ukraine	**Christian Lewis**	Karla Stouse	This research seeks to determine whether Holodomor, the Soviet "terror famine" of 1932-33, was caused by policies intended to suppress, retaliate against, or destroy the Ukrainian population. I examine survivor testimonies, Soviet documents, and the personal correspondence of Joseph Stalin. Additionally, I draw on work by historians Anne Applebaum, Robert Conquest, and Timothy Snyder. Using the genocide risk framework provided by the United Nation's Office of the Special Adviser on the Prevention of Genocide, I conclude that the Soviet practices and policies executed throughout 1932-33 in Ukraine satisfy the contemporary genocide definition. This conclusion contradicts Russian President Vladimir Putin's thesis in "On the Historical Unity of Russians and Ukrainians," demonstrating that the peoples of Ukraine suffered tremendously during their union with the Soviet Republics. This research could provide valuable insight into Ukrainian history, the ongoing invasion of Ukraine, and the political situation throughout eastern Europe.
Recreating the Sound: Approaching and Creating New Sounds for Videos	**Madeline Sinnamon**	Erik Deerly	One of the classes that I am taking this semester is called Sound in Context, which is an audio designing class for video or any situations. I will be presenting two projects that I completed in this class. The first is dance video in which I took an existing video and replaced the audio with music that I composed myself in order to give it a new context. The second is creating new sounds for a movie scene with new background music and sound effects that I also recorded myself. The purpose of both of these projects is to show that everyone has different and unexpected approaches to creating art and music for video and design.

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Discovering Tomorrow's Teachers

Presentation Session – 3-4:15 p.m.

Project Title	Presenter	Faculty Mentor	Abstract
Tomorrow's Teachers Present Educational Philosophies and Ideas About Teaching	**Brianna Aviles, Aubrey Baer, Sophia Brown, Cami Caldwell, Mackenzie Collins, Connor Etchison, Gracie Fouch, Regan Kimbler, Abigail Mitchel, Alexis Montemayor, Andrew Newcomer, Naomi Packard, & Seainna Winner**	Christina Romero-Ivanova	This session focuses on Tomorrow's Teachers/high school students' presentations of their classroom management plans constructed in fall 2021 in their course Examining Self as Teacher in which their instructor, Dr. Christina Romero-Ivanova taught them in their first year of the Indiana University Kokomo Tomorrow's Teachers program - a program for high school juniors and seniors who want to become teachers. In this presentation, students' educational philosophies, classroom layouts, expectations, and ideas about teaching will be presented in a digital poster format.