STUDENT SYMPOSIUM

Hosted by Sponsored Projects Administration at Ball State University

APRIL 13 - 28, 2021 / Virtual Exhibition

https://digitalresearch.bsu.edu/studentsymposium2021/
Students at Ball State University are widely known for their ability to take disciplinary knowledge learned in the classroom and apply it to high-quality research projects and innovative creative endeavors.

For over twenty-five years the Student Symposium at Ball State University has provided students with the opportunity to showcase creative and scholarly projects, while gaining practical experience presenting their work.

The Student Symposium encourages interdisciplinary discourse, allowing students to learn from each other about engaging topics from many disciplines around the university.

This year’s Student Symposium is being held virtually using the Omeka platform.

Virtual exhibits are eligible for one of six scholarship awards.
EVENT SCHEDULE

March 22 - April 5 | Submission Window
April 13 - April 23 | Judging Window
April 13 - April 28 | Presentation Review

* represents Honors college students
College of Communication, Information and Media
Loren Dent

Journalism

College of Communication, Information, and Media

Veil of Darkness: An Expansion on the Hypothesis in the Context of Racial Profiling

The Veil of Darkness (VOD) hypothesis presents an opportunity to test for racial profiling in traffic stops without requiring external estimates. It is a hypothesis that police are less likely to identify a driver’s race before stopping them after dark than during daylight. This study’s data comes from the Chicago Police Department’s Investigatory Stops between January 1, 2016, and February 28, 2017. This study seeks to expand on the VOD hypothesis by examining investigatory traffic stops while also considering the vehicle’s make and model. The use of a natural experiment based on daylight impacting the likelihood of officers conducting a traffic stop because they can see the race of the driver (according to VOD), and examining investigatory stops will allow the researchers to consider the intent of the officer in the context of racial profiling.

Faculty Mentor: Anthony Vito

College of Sciences and Humanities
Lynn Rollins
Telecommunications
College of Communication, Information, and Media

Pregnancy Fasting in Three Cultures

Funded by New Faculty Start-Up

Pregnancy fasting is an enigma: why would a woman restrict her food intake during a period of increased nutritional need? Prior research lacks systematic methodology to assess women’s views of the consequences of pregnancy fasting, and how these views can be compared across diverse cultural groups. The aim of this study was to therefore compare perceptions of the consequences of pregnancy fasting in India. This cross-sectional study took place in two states in India: Bhubaneshwar, Odisha and Mysore, Karnataka, among two populations of Hindu women and one population of Muslim women (N=90). In total, 64% of women fasted in prior pregnancies. Each community reported differences in positive and negative consequences of fasting, with varied emphasis on reproductive health, religiosity, and general health and wellbeing. These findings challenge mainstream biocultural theories of fasting and pregnancy diet and point to the prominent role of religion in influencing dietary abstention.

Faculty Mentor: Caitlyn Placek
College of Sciences and Humanities
Sam Ortega
Communication Studies
College of Communication, Information, and Media

**Windfarms for Muncie**

As the world continues to look for new ways to create electricity, renewable energy has been rising in its popularity and use. These farms provide tons of electricity for cities that these turbines surround. The closest windfarms to Muncie are located near Winchester in Randolph County with more becoming operational. InsideIndianaBusiness reports that within the past few years, EDP Renewables has picked up 17,000 acres to build on in less than a year. Project manager Paul Cummings has stated that residents have embraced the wind farms and have been easy to work with. Delaware County currently has no wind farms, and it doesn't look like it will in the near future. The last proposal back in 2013 was met with backlash with zoning being one issue. The proposal stated that Turbines will be located 1,000 feet from buildings and 2,000 feet from cities and towns. The proposal can be found on the Delaware county website along with an article about the health impact from these turbines. This proposal and website should be revised to help advocate for these turbines while the new proposal could have revised zoning distances with plans on where to build. Using Randolph County as a guide, this presentation will advocate educational strategies to overcome objections and introduce wind farms to Delaware County.

Faculty Mentor: Gerald Waite
College of Sciences and Humanities

Zack Hansen
Communication Studies
College of Communication, Information, and Media

**Jazz and Civil Unrest: Miles Davis, the Civil Rights Movement, and the Illusion of Life**

This research essay aims to examine whether Miles Davis' album "Kind of Blue" acts as a collaborative representation of the Civil Rights Movement of the late 1950s. The framework for this piece is based on the Illusion of Life rhetorical model, which poses that music, both lyrical and non-lyrical, can act as a rhetorical device that is just as impactful as any contemporary form of rhetoric.

Faculty Mentor: Beth Messner
College of Communication, Information, and Media
College of Fine Arts
Alyssa Shoults & Abbey Jessup

Art
College of Fine Arts

Conservation Tales

Funded by Discovery Women's Group, Midwest Museum of Natural History, and the Ball State College of Sciences and Humanities

Conservation Tales is an immersive learning course that combines research and art to create a children's book series about conservation actions. The books are created by the students, with a combination of digital and traditional art, photography, writing, and graphic design. This project teaches skills of transforming the acquired scientific research into something simple and accessible that young readers can understand.

Faculty Mentor: Barbara Giorgio-Booher
College of Fine Arts

Carly Lucas

Theatre and Dance
College of Fine Arts

The Dance-Language Conflict

The Dance-Language Conflict is a performative research presentation that premiered digitally in December 2020. The work is composed of a spoken argument presented alongside the results of a movement experiment where research participants were asked to attempt to translate dance. The foundation of the argument is that dance is not its own language; opposing ideologies by credible modern dance artists such as Martha Graham and Ohad Naharin. By examining the characteristics of language and investigating how or if the exist in dance, it is suggested that treating dance as a language provides true limitations for the art form, especially in regard to accessibility and innovation in the field.

Faculty Mentor: Jenn Meckley
College of Fine Arts
Victoria Bulick
Art
College of Fine Arts

Remembrance: Research on Body-Memory and Movement Therapy

Remembrance is a piece created navigating body-memory with trauma and movement therapy. After a year long process of research that turned into personal research that turned into a dance film. This involved taking personal trauma and using movement therapy to heal from the past trauma that is held in the body as body-memory. Movement therapy is another form of therapy that does not involve speaking but personal navigation with some guidance. In the film you can see the dance navigating this idea of movement therapy through the art forms of drawing and dance.

Faculty Mentor: Jennifer Meckley
College of Fine Arts
College of Health
Anya Eicher
Kinesiology
College of Health

Exploring the Effects of Demographic and Athletic Variables on the Retention of International Student-Athletes

The issue of student retention has long been an issue for college and university administrators. But while the topic of student retention has been well explored, smaller samples of the student population are yet to be analysed. Among these groups are international student-athletes. Within the student-athlete research, many scholars state that the significant cultural differences international student-athletes experience is cause for exploration into how retention variables differ for these students. The purpose of this study is to examine athletic and demographic variables to determine if any of these variables can predict the retention of international student-athletes. Retention is defined as the continuous enrolment in a college or university until graduation, typically in around four years. Nine independent variables will be used to evaluate retention among NCAA Division I international student-athletes; gender, location of home country (by continent), English proficiency, sport, sport type (individual or team), scholarship type (headcount or equivalency), coaching change, and team winning percentage average, and team winning percentage in final year of competition. Correlation matrices and multiple linear regressions will be used to determine (1) if there is a correlation between the variables, and (2) if any of the variables can predict retention of international student-athletes. Ultimately, the results will have the potential to help college athletic personnel create best practices for developing and retaining international student-athletes.

Faculty Mentor: James Johnson
College of Health
Briana Halloran

Nutrition and Health Science
College of Health

Postpartum depression and preconception vitamin supplementation: An analysis of the Pregnancy Risk Assessment Monitoring System (PRAMS), 2016-2018

Postpartum depression (PPD), a mood disorder with a relatively unknown cause, affects around 1 in 8 women in the United States. Micronutrient levels may contribute to the pathophysiology of mood disorders and depression. This analysis aimed to examine the relationship between the intake of preconception vitamin supplements and the development of PPD using the Pregnancy Risk Assessment Monitoring System (PRAMS). The results of this analysis will better prepare healthcare workers, including dietitians, to educate women during the preconception period on the benefits of vitamin supplementation.

Faculty Mentor: Mengxi Zhang
College of Health
Keith Rodgers & Natalie Brooks
Speech Pathology and Audiology
College of Health

Establishing the Audiological Role in Diabetes Treatment Through Interprofessional Community-Based Diabetes Prevention Program

My research partner and I helped establish the Ball State College of Health (CoH) Diabetes Prevention Program (DPP) on campus alongside other CoH graduate students. This program uses a CDC approved curriculum to teach prediabetic community members about exercise, nutrition, and mental health; it also helps them set goals for activity and weight loss. My partner and I also initiated an optional research study, approved by the IRB, that collects pre and post health attitude surveys and balance data. The pre and post balance data could be used to show the importance of an Audiological role in DPP.

Faculty Mentor: Blair Mattern
College of Health

Mariah Grange & Lauren Wake
Speech Pathology and Audiology
College of Health

Infant Hearing and Post-Partum Depression/Anxiety Screening: An Inter-Professional Approach

Postpartum depression (PPD) is a worldwide problem that people around the world know little information about. One in every seven women experience PPD postnatally. Several health professionals are unaware of specific signs, symptoms, red flags, and risk factors that occur with PPD. In the United States, mothers do not usually see their primary doctor until about six weeks postnatal. This means that for many of these mothers with PPD, they could potentially be going up to six weeks without receiving any care for their depression. This study seeks to identify mothers who have PPD, guide them to seek help, and educate other health professions the importance of screening mothers for PPD.

Faculty Mentor: Lynn Bielski
College of Health
Mitchell Kissick & Anthony Milesi
Speech Pathology and Audiology
College of Health

Noise Induced Hearing Loss in Recreational Firearm Users

Noise induced hearing loss is a common health concern for recreational firearm users. While many gun ranges require the use of hearing protection devices, many recreational firearm users may not consistently use hearing protection in other situations. Our survey looked at attitudes of adult shooters, and this information will then be used to develop hearing conservation materials to be distributed.

Faculty Mentor: Lynn Bielski
College of Health

Samuel Rosario
Kinesiology
College of Health

The Effects of Localized Muscular Fatigue on Lower Body Running Mechanics and Muscular Activation During Treadmill Running

The effects of fatigue on running mechanics is multifactorial, and previous research suggests fatigue is a risk factor for running-related overuse injuries. The purpose of this research is to investigate the compensations that arise from inducing local isokinetic muscular fatigue about the knee flexors and extensors during running. Twenty male and female (10 male, 10 female) recreationally active healthy college-aged students volunteered for this study. Participants ran on an instrumented treadmill at 3.61 m/s pre-fatigue, immediately post-fatigue, and 10-minutes post-fatigue. Maximal voluntary isometric and isokinetic contractions were completed. Fatigue was induced via continuous concentric and eccentric flexion or extension efforts at 60 deg/sec on two separate testing occasions. A set was terminated after three consecutive concentric actions below the participant’s 50% maximal voluntary contraction effort, and was repeated three times to fatigue. It is hypothesized localized fatigue will exhibit increased biomechanical risk factors for running-related overuse injuries.

Faculty Mentor: Clark Dickin
College of Health
Sophia Mancini
Kinesiology
College of Health

**Effects of a Soccer Specific Vertical Jump on Landing Mechanics**

Funded by ASPIRE Internal Grant Program

The popularity of women’s soccer has been rapidly increasing in the United States and unfortunately so has anterior cruciate ligament (ACL) injury. Previous research has established several kinematic, kinetic, and muscle activation patterns that are typically seen at the time of injury. This research project involves using biomechanics methods to analyze the injury risk of the unique landing that occurs following doing a header in soccer.

Faculty Mentor: Henry Wang
College of Health

Sydney DeJonge
Kinesiology
College of Health

**The Effects of a Treadmill Workstation on Coagulation Potential**

This study will provide applicable information demonstrating if a treadmill active workstation will improve the risk of a thrombosis forming. The purpose of this study is to observe the beneficial effects of walking at an active workstation on physiological changes in coagulation compared to a sedentary workstation.

Faculty Mentor: Paul Nagelkirk
College of Health
College of Sciences and Humanities
Abdulgadir Elnajdi
Environment, Geology, and Natural Resources
College of Sciences and Humanities

A Spatial Analysis of Muncie Soils Associated with Elevated Blood Lead Levels

We analyzed the blood lead levels (BLL) using the blood lead data provided by Regenstrief Institute, Indianapolis, IN (IRB Protocol 1181099-2). Through ArcGIS Pro and SPSS, spatial patterns were analyzed across multiple metrics, including BLL test results (0 to 5 µg/dL, >10 µg/dL, and >25 µg/dL), age group, season, as well as the interaction between each available variable. To assess the hypothesis that the elevated BLLs are caused by lead contamination in soil, potentially resulting from legacy manufacturing sites, we developed a comprehensive, biased sampling approach based on the BLL data. Soil samples were collected from at-risk public areas, as indicated by the mapped BLL values exceeding 10 µg/dL. Soil sample analysis was conducted via EPA method 3050B for bio-accessible lead by GeoChemical Testing in Somerset, Pennsylvania.

Faculty Mentor: Adam Berland
College of Sciences and Humanities
Adeola Olaniyan
Mathematical Sciences
College of Sciences and Humanities

A comparison of machine learning techniques in predicting 10-year risk of coronary heart disease

Studies have been carried out to develop models in predicting the risk of 10-year coronary heart disease (CHD) in patients using the Framingham data set. However, the different models for this study were developed with the use of machine learning techniques in predicting the risk of 10-year CHD. The model with the lowest test error and the highest prediction accuracy is selected as the preferred model.

Framingham data set is a secondary data from an on-going longitudinal survey in Massachusetts. Various machine learning techniques such as Multivariate Logistic Regression, Linear Discriminant Analysis, Classification Tree, Bagging, Boosting and Random Forest Algorithm to develop models to predict 10-year risk of CHD. The multivariate logistic regression model as the lowest test error of 0.00018 and 85% prediction accuracy. The variables selected in the model are Age, gender, systolic blood pressure, blood pressure medication, BMI and glucose. Age, gender, and systolic blood pressure have been the three most significant features in all the machine learning technique models.

This analysis is not gender specific to show the age at which a patient’s systolic reading can be interpreted to be in the high blood pressure range leading to the risk of coronary heart disease considering all other significant risk factors. Further research and analysis could be carried out to show the age at each gender could be at risk of a 10-year risk of CHD.

Faculty Mentor: Rebecca Pierce
College of Sciences and Humanities
Bacteriophage control of Salmonella enterica in artificially contaminated 1%, pasteurized milk

Funded by LSAMP Program

Salmonella spp. are the number one causative agent of foodborne illnesses in the United States. Salmonella spp. are resistant to multiple antibiotics leaving only a few that can be used to treat these infections. Alternatives to antibiotics are needed to treat infections where the bacteria are resistant to all antibiotics. Bacteriophage have been considered an alternative to antibiotics because of their ability to kill their hosts. The goal of this project is to isolate and characterize bacteriophage from a raw milk environment to use as a biological control of Salmonella enterica contamination of food products. For this experiment two bacteria will be used; Salmonella enterica subspecies enterica serovar Enteritidis ATCC 13076 was bought and S1 (an uncharacterized, unknown bacteria) was isolated from raw dairy milk. Pasteurized milk bought from the grocery store will be inoculated with either Salmonella enterica or S1 to create an artificially contaminated sample. Bacteriophage will be added at varying densities the observe their affinity for either S1 or Salmonella enterica. We expect to see that the bacteriophage will have a higher affinity for S1 than it will for the lab made Salmonella enterica.

Faculty Mentor: John McKillip
College of Sciences and Humanities
Finwell Apps

Given the profound success of applications such as Mint, it is apparent that budgeting softwares aid in the promotion of financial literacy, security, and growth. On a broad scale, apps like Mint can be an exceptionally helpful tool to users that have a basic understanding of their finances but need help in tracking spending. To avoid problems such as overwhelming users — something that applications like Mint can be guilty of — Finwell Apps seeks to teach financial literacy at an elementary level by providing simplistic and straightforward functionality with a streamlined UI. Sophisticated financial resources are provided throughout the user’s experience with the app to further enforce financial responsibility and growth.

Finwell Apps is developed using Xamarin.forms to be deployed natively on both iOS and Android, ensuring that the application is accessible to all users regardless of platform. Furthermore, it uses SQLite to store data locally to the user’s phone in order to keep track of the user’s savings goals and budgets.

The application, developed for MoneyTree Software, will be utilized by the organization Habitat for Humanity in classrooms to teach principles of financial wellness to residents of Delaware County. Through the use of Finwell Apps, residents of Delaware County will be able to better gain control of their finances and increase the quality of their life.

Faculty Mentor: Huseyin Ergin
   College of Sciences and Humanities
Alexa Pellegrino

Psychological Science
College of Sciences and Humanities

**Associations Between Attachment Style, Reactive Aggression, and Emotion Regulation**

Emotion regulation difficulties can often lead to externalizing problems, including increased aggression, and the increased likelihood of engaging in aggressive behaviors. Insecure attachment styles have a significant relationship with aggressive behavior and anger, as well as higher levels of negative emotionality and experience emotion regulation difficulties. Thus, the current study’s goal is to explore the associations between: (1) emotion regulation and reactive aggression; (2) reactive aggression and adult attachment style; and (3) adult attachment style and emotion regulation. Furthermore, it is of interest to examine if emotion regulation mediates the association between attachment style and reactive aggression. This relationship has not been thoroughly researched and will be important to understand the relationship. This will be addressed through a series of self-report questionnaires regarding emotion regulation, attachment style, and reactive aggression. Understanding the relationship and associations between adult attachment styles, emotion regulation abilities, and reactive aggression will allow clinicians the ability to predict who will use problematic reactive aggression and have the ability to target these aggressive behaviors. These findings may inform and guide treatment and interventions, by targeting emotion regulation skills and training to reduce these aggressive tendencies.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Alexandra Doerner, Elli Cole, Alexandria Epperly & Chloe Woodling

Psychological Science
College of Sciences and Humanities

The Influence of Perseverance and Procrastination on Strategic Approaches to Learning

Grit is the perseverance and passion for long term goals (Duckworth et al., 2007). Perseverance has been linked to self-regulated learning, lower levels of procrastination, and academic achievement (Wolters & Hussain, 2014). Self-regulated learning, such as strategic learning approaches, has also been linked to better academic performance (Grøm Saele et al., 2017). In contrast, procrastination indicates a lack of self-regulation and is associated with poor academic performance. Therefore, it was first hypothesized that perseverance would predict higher strategic learning. The second hypothesis was that procrastination would mediate the relationship between perseverance and strategic learning. College students (N=127) completed the GRIT Scale, the ASSIST, and the Procrastination Scale. To investigate procrastination as a mediator of perseverance and strategic approaches to learning, a mediation analysis was conducted using PROCESS (Hayes, 2017). Gender was included as a covariate in the model due to past research (i.e. Voyer & Voyer, 2014), and significant relations to the dependent variables. The results supported the first hypothesis, perseverance significantly predicted strategic approaches to learning and accounted for 30% of the variance (R²=.30, p<.01). The second hypothesis was supported as procrastination partially mediated the relationship between perseverance and strategic approaches to learning based on significant indirect effects (ab=1.14, BCa CI [.38, 2.11], where lower procrastination levels explained the relationship between higher perseverance and greater strategic learning. These results will be discussed in relation to college students’ academic performance and potential interventions for academic success.

Faculty Mentor: Anjolii Diaz
College of Sciences and Humanities
Alexandria Epperly
Psychological Science
College of Sciences and Humanities

Cognitive Effects of Individual Differences in Sensory Processing Sensitivity

Research on environmental sensitivity has primarily focused on the genetic and environmental factors that may play a role in the development of this trait, as well as how the characteristic differential neural activity in highly sensitive individuals may relate to common features, such as increased awareness of environmental subtleties and increased ability to empathize with others (see Greven et al., 2019 for a review of current research). The current study aims to contribute to the literature by investigating the implications of individual differences in environmental sensitivity on cognition, specifically in episodic memory performance. This study will also investigate how individual sensitivity may impact established relationships between stimuli valence and memory performance (Kensinger, 2009). A convenience sample of Ball State University students will be used to assess these possible relationships and measurements will be obtained through the use of the Highly Sensitive Person Scale (Aron & Aron, 1997) and a semantic processing task developed from Packman and Battig (1978). It is hypothesized that environmental sensitivity will correlate positively with episodic memory performance, that recall performance within subjects will vary across word valence categories in accordance with previous findings, and that the relationship between word valence and memory performance will differ significantly between sensitivity groups. Results from this study will emphasize the importance of considering the impact of individual differences in sensitivity on cognition and other aspects of every-day life.

Faculty Mentor: Daniele Nardi
College of Sciences and Humanities
*Alexis Jennings*

Psychological Science  
College of Sciences and Humanities

**Perceptions of Grief Severity: How Outsiders’ Perceptions of Grieving Pets and Humans Differ**

An individual grieving a pet has not always been perceived as being a valid experience if at all comparable to grieving humans (Eckerd et al., 2016; Packman et al., 2012). Currently research demonstrates the severity of grieving pets is at a similar rate to losing a close friend (Gerwolls & Labott, 1994). Previous survey data has focused on the experiences of pet and human grief separately (Prigerson et al., 1995; Eckerd et al., 2016). This experimental research design aims to further the limited research on this topic by comparing the perceptions of pet and human grief.

This study will set up a between-subjects design in which participants recruited through Facebook or Reddit are randomly assigned to read a vignette about an employee experiencing a pet or human death. Participants pretending to be a manager must approve between zero to fourteen days off from work. Then participants report their perception of the employee’s psychological distress (Kessler et al., 2003), perceived stress (Cohen et al., 1983), and Core Bereavement Index severity (Burnett et al., 1997). Participants also rate their own previous grief symptoms using the same Core Bereavement Index. Participants may also rate their grieving experience regarding a pet death on the abridged Pet Bereavement Questionnaire (Hunt & Padilla, 2006; Matte et al., 2020). An independent samples t-test will be conducted to compare the two conditions. Multiple factorial ANOVAs will also be run to address the impact of participant’s gender as well as personal grief experience on perception ratings.

Faculty Mentor: Katie Lawson  
College of Sciences and Humanities
**Alexis Detrich**

Psychological Science  
College of Sciences and Humanities

Examining Gender Identity in Spatial Ability: Influences on Mental Rotation Tasks, Spatial Anxiety Scales, and Spatial Memory Tasks

Broadly, gender identity research has received more attention in recent years as research indicates that previous conceptions about gender identity and incongruence with sex are incorrect and are now known to occur from biological and environmental differences. Much of the research on spatial cognition focuses on sex differences found among certain tests of spatial ability (e.g., Levine et al., 2016; Nazareth et al., 2019; Voyer, Voyer, & Bryden, 1995). However, little to none of the research considers the role of gender identity in spatial abilities. Gender identity, defined as the internal identification and expression of gender (Money & Ehrhardt, 1987), differs from sex in the sense that sex is assigned by a physician at birth, and does not always represent how the individual identifies later in life. As not much research exists on the measurement of individual high in masculine or feminine traits but who do not hit the threshold for gender incongruence with their sex, this study aims to address how varying levels of masculinity and femininity in individuals may influence performance on spatial ability tasks. Mental rotation tasks, spatial anxiety scales and object-location memory tasks were selected on the basis that each have a robust literature backing male or female advantages (ex: Voyer, Voyer, & Bryden, 1995; Lawton, 1994).

Faculty Mentor: Daniele Nardi  
College of Sciences and Humanities
The Effects of Agreeableness and Political Orientation on Perceptions of Aggression in Media

Research on aggression in media is often focused on the aggression’s influence of later aggressive acts. One area that is often not researched is the perceptions of these aggressive acts, and how they are influenced. Prior research on influences on perceptions have shown that they can be influenced by ingroup bias (Hastorf & Cantril, 1954; Kim, 2016) and differences in personality (Costa & McCrae, 1986). These areas of research can be tied together in order to look at the differences of perceptions of aggressive acts and how they are influenced, specifically looking at political ideology and agreeableness. This is the focus of the present study, by seeing how the differences of political ideology and agreeableness affect how individuals perceive acts of aggression. The acts of aggression that will be focused on are video media of interactions between police and protestors during a Black Lives Matter protest.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
*Allen Warren  
English  
College of Sciences and Humanities  

**Life's a Peach: The Convergence of Sexuality and Class in Guadagnino's Call Me by Your Name**

Call Me by Your Name (2017) became famous for its “peach scene,” though the orchard around the Perlmans’ villa where this fruit thrives could not have grown on its own. Distinctions of class and a parasitism by the most affluent of their workers cultivate the paradise where director Luca Guadagnino sets the blossoming romance between Elio and Oliver. Apricots are a clear metaphor for desire here, yet their prolificacy is only possible through the invisibility and silent intervention of other food items, from peas to latkes to frozen chicken. Critics have pointed out the beauty of the Italian setting and its use as a temporary escape from heteronormative surveillance, as well as the way domestic workers flow in and out of scenes almost wordlessly. What these critics have missed is the connection these occurrences have in explaining how the working class have built (but do not benefit from) this heaven on Earth, where the young male lovers may permit their bodies to act without restraint. While queer and class theories inform this discussion, my primary vehicle for interpretation will be food, both for its prominent place in the movie and for the ways it parallels the class structure at the villa. I find the film quietly reflects on the levels of economic privilege and exploitation needed to experience the paradise it depicts, with the usurpation of food in many scenes helping to remind the audience of the stepping-stones Guadagnino asserts are required to access this more subversive space.

Faculty Mentor: Emily Rutter  
College of Sciences and Humanities
Anna Himes
Psychological Science
College of Sciences and Humanities

Trait Anxiety and Assessment of Ambiguous Emotions

The purpose of the current study is to examine whether trait anxiety affects participants’ ability to recognize facial emotions. Past research has supported the notion that high levels of anxiety may result in an inaccurate recognition of emotion. Specifically, possibly through mechanisms such as the Facial Feedback Hypothesis, Embodied Emotion Simulation, and the role that the amygdala and medial prefrontal cortex play in attending to threatening information, past research has supported the notion that individuals with anxiety are more likely to misclassify non-threatening emotions as threatening. However, there has yet to be a robust set of studies which observe this relationship with the added factor of ambiguity created by surgical masks. In this study, college students will complete a trait anxiety measure and will be asked to judge the expression shown in each of 56 photographs of Black and White males and females who are expressing anger, fear, disgust, happiness, calm, sadness, or are neutral. Half of the photographs include surgical masks covering the bottom half of the person’s face. Three hypotheses will be tested: Participants with higher trait anxiety will be less accurate at identifying masked and unmasked emotions than participants with lower trait anxiety overall; Participants with high trait anxiety will misclassify non-threatening masked and unmasked emotions (happy, clam, neutral) as threatening emotions (anger, disgust, fear) more often than participants with low trait-anxiety; and participants with high and with low trait anxiety will perform more accurately in assessing unmasked emotions than in assessing masked emotions.

Faculty Mentor: Kristin Ritchey
College of Sciences and Humanities
The Relationship of Parental Communication and Emerging Adulthood Risky Behaviors of Binge Drinking and Vaping

Past research regarding parental communication and risk-taking behaviors largely focused on risk taking behaviors happening during adolescence, more specifically, the focus has largely been on sexual risk-taking behaviors. The current research examines this relationship of parental communication and risk-taking behaviors but shifts the focus to risk taking behaviors happening in a different developmental period—emerging adulthood. The risk-taking behaviors examined in the present study are binge drinking and vaping as they have not been extensively researched in the past. The present study’s objective was to determine whether parental communication happening during adolescents would be related to risk-taking behaviors happening in emerging adulthood. It was hypothesized that parent-adolescent communication will have a negative relationship with both alcohol use and use of electronic cigarettes during emerging adulthood.

Faculty Mentor: Anjolii Diaz
College of Sciences and Humanities
*Bobbie Burton*

Psychological Science

College of Sciences and Humanities

**The Effects of Moral and Pragmatic Reasons for Diversity on Institutional Trust and Organizational Commitment**

This study examines how an organization’s decision to implement a diversity program affects people’s perceptions of the organization. More specifically, is a simple commitment to diversity enough to elicit institutional trust and organizational commitment from its members, or do trust and commitment depend upon the motive for adopting the initiative? Specifically, this study focuses on moral motives ("It’s the right thing to do") as compared to pragmatic motives ("It’s the practical thing to do"). Adapted versions of the Affective Commitment Scale (Meyer & Allen, 1990) and the Trust in Organization Scale (Robinson, 1996) are used to measure organizational commitment and institutional trust. Participants are randomly assigned to one of three conditions in which they are tasked with reading 1) a hypothetical policy that supports diversity implementation for a moral reason, 2) a hypothetical policy that supports diversity implementation for a pragmatic reason, or 3) a hypothetical policy unrelated to diversity. Participants are asked to answer questions about their perceptions of the organization’s decision and motives, as well as their support for the proposed hypothetical policy. It is expected that a moral motive for diversity implementation will elicit greater organizational commitment and trust than a pragmatic motive.

Faculty Mentor: Andrew Luttrell

College of Sciences and Humanities
**Brevin Wittmer, Evan Mitchell, Collin Stiner & Nick D'Agostino**

Computer Science  
College of Sciences and Humanities

**Regalia Share - Creating Community**

A platform for Ball State faculty to borrow and loan various pieces of Regalia, to help foster a better community and provide a no-cost way of obtaining Regalia.

Faculty Mentor: Huseyin Ergin  
College of Sciences and Humanities

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**Brooklyn Boatright**

Environment, Geology, and Natural Resources  
College of Sciences and Humanities


Funded by the ASPIRE Internal Grant Program

The leucogranites located in the Mt. Everest, Nepal region of the Himalaya Mountains do not have reliable age dates. The objective of this study is to determine the crystallization age dates of the Mt. Everest region leucogranites by analyzing zircons included in those leucogranites for split-stream U-Th-Pb, Lu-Hf, and trace/REE data using SHRIMP and LA-ICP-MS instrumentation. Thin sections will be used to complete a microscopic petrographic analysis to identify igneous and metamorphic features in the leucogranite. Understanding the age date and trace/REE composition of the Mt. Everest leucogranites could lead to insight on their circumstantial origin, the possibility of their undergoing multiphase metamorphism, timing constraints for the movement of local faults, and the generation of economically viable ore deposits in the Himalayan Mountains.

Faculty Mentor: Kirsten Nicholson  
College of Sciences and Humanities
*Brooke Walter*

History  
College of Sciences and Humanities

**Food In History Through Chaucer**

Funded by Other College Funding

This project allows for students to be able to use their knowledge in other subjects as well as be able to argue their point by using facts which will always be helpful. The objective of this project is for students to be able to figure out new perspectives historically through methods not used before by looking at literature at the time and how food is being portrayed. Students after reading will then research their character that they were assigned and determine whether their interaction of food portrayed in the book is accurate. This is great for students to be able to practice multiple skills in one lesson as well as be able to use their skills in multiple subjects being taught.

Faculty Mentor: Alexander Kaufman  
Honors College
Bryce Woody, Zach Hoeing, Justin Russell & Corbin Curnutt

Computer Science
College of Sciences and Humanities

Full Court Analytics

A subscription-based analytics tool for basketball coaches that provides insight on the efficiency of their team from season performance to game performance. The tool also includes advanced stat tracking, line-up proficiencies, and play-by-play tracking.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities

Bryce Kramer

Physics and Astronomy
College of Sciences and Humanities

Electron Transport and Conductivity in DNA

As technology pushes processors to become smaller and denser, processor chip manufacturers are trying to find ways to make transistors smaller and smaller. However, current transistor designs are becoming increasingly difficult to squeeze into smaller and smaller areas without compromising the integrity of the transistors. As a result, a new candidate has gained attention for its potential uses in many areas, especially nanotechnology: Deoxyribo nucleic acid (DNA). DNA has many properties that make it a potential candidate for nanotechnology including its ability to self-assemble, which can allow easier fabrication on the nanoscale. However, studies have also shown DNA to have insulating, conducting, semi-conducting, and superconducting properties given different conditions. These findings, as well as other known factors about DNA, are leading researchers to study DNA’s potential in different aspects of nanotechnology, such as potentially being a semiconductor within a nanoscale, self-assembling transistor. This project will investigate electron transport and conductivity in DNA molecules and how these properties may be able to advance nanotechnology in the future.

Faculty Mentor: Yong Joe
College of Sciences and Humanities
**Cailon Nicoson**  
Psychological Science  
College of Sciences and Humanities  

**Between a Rock and a Hard Place: How Transportation into Stories Representing Protagonist’s Criminal Behavior Affects Reader’s Empathy**  

Previous research has found that reading fictional stories can increase empathy in individuals who read it (Bal & Vetkamp, 2013; Dodell-Feder & Tamir, 2018; Kaufman & Libby, 2012; Stansfield & Bune, 2014). One important factor that contributes to fiction’s potential empathy-teaching effect is the concept of transportation; transportation is the reader’s ability to “transport” themselves into the story, particularly in the shoes of the protagonist, to better understand how they themselves would react in the character’s situations (Bal & Vetkamp, 2012). The current study analyzed the effect transportation into a story in which the protagonist engaged in a criminal act (e.g., substance abuse and theft) could have on the reader. Participants were asked to read two texts each; one arranged as a list of facts and the second being an emotionally-charged, third-person perspective of either the protagonist’s engagement in substance abuse or theft. One group received one compilation of facts regarding the protagonist’s engagement in either substance abuse or theft and one emotionally-charged account of the protagonist’s engagement in the offense not represented in the first story. Participants’ empathy was measured with eight Likert scale questions. Participants were predicted to show more empathy for the characters portrayed in the emotional texts than the non-emotional texts, regardless of the crime committed, due to the increased transportation that should occur with the emotional text.

Faculty Mentor: Kristin Ritchey  
College of Sciences and Humanities
Caitie Flower
Psychological Science
College of Sciences and Humanities

Evaluating a Course for Training Undergraduate Teaching Assistants

Pre-test and post-test data were collected from undergraduate students enrolled in PSYS 477 (Teaching Assistantship Seminar) to evaluate changes in their content knowledge, procedural knowledge, and metacognition regarding teaching. It is hypothesized that participation in the course will increase students' knowledge and self-efficacy regarding their teaching duties.

Faculty Mentor: Kristin Ritchey
College of Sciences and Humanities

Cam Dowless, Kade Dentel, Evan Knapke & Erick Sands
Computer Science
College of Sciences and Humanities

Merit Engine - A New Paradigm in Financial Advising

Financial advisors are increasingly dependent on the digital tools they use to serve their clients. These tools cover a comprehensive domain from portfolio management to client onboarding systems. We developed Merit Engine to explore a new field of financial advising software. Merit Engine offers advisors a method of crafting and visualizing hypothetical investment strategies. This delivers advisors the ability to determine what strategy best fits their clients based on real data visualizations.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Sleep Patterns in Nursing Students

There is precedent that nurses and students have unhealthy sleep patterns and sleep hygiene (Geiger-Brown et al., 2012; Hershner & Chervin, 2014; Kloss et al., 2016; Ross et al., 2017; Yazdi et al., 2016). The purpose of current research is to determine if a student’s year in school (i.e., first year, second year, etc.) is related to any unhealthy sleep patterns or hygiene they may present. A survey including the PSQI, the Sleep Knowledge subscale of the SHAPS, and a survey of demographics screening out those with disordered sleep will be used to determine sleep quantity, quality, and hygiene knowledge patterns across cohorts. If there is evidence of poor sleep quality, quantity, or hygiene knowledge in this population, it indicates that more research should be done on how severe these variables may impact performance of nursing students. Highlighting specific years or times where these unhealthy practices may be more prevalent could help determine when sleep education should be utilized to help the population build healthy sleep habits before going into the nursing field. It will also provide data for future studies on what patterns of sleep to expect in this population.
Betterflye Mobile: A Trek through Flutter Development

Betterflye is a social impact platform designed to connect organizations with volunteers and encourage social good via gamification; our project is to expand the Betterflye ecosystem with the addition of a cross-platform mobile application that allows users to access the platform.

Betterflye Mobile is built on the Flutter Framework and the mobile application communicates with a REST API written in PHP. The main focus of the app has been in building a robust check-in and check-out system using QR Code scanning. Users have a unique QR code assigned to them that can be scanned by an initiative manager to check them into an initiative. Alternatively, if initiatives have self-check-in enabled, users can scan an initiative’s QR code in order to check themselves in or out. The repository is configured with a CI pipeline that runs automated tests, checks for formatting errors, and publishes code coverage reports on each pull request. When any commits are merged to either the develop or master branch, there is a CD pipeline which builds an app bundle, deploys it to an internal testing track in Google Play, and posts a notification in the team’s Slack channel.

The team has embraced agile and scrum methodologies and conducts plannings, standups, reviews, and retrospectives each sprint/review cycle.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Cassandra Zeigler

Psychological Science
College of Sciences and Humanities

Emotion Dysregulation and Attachment Insecurity in Romantic Relationships

Attachment styles in adulthood describe individual approaches to interacting and behaving interpersonally, or patterns of secure and insecure attachment orientations in romantic relationships (Bowlby, 1969). While previous research has demonstrated that insecure attachment styles are related to difficulties with regulating emotions (Gross & John, 2003; Owens et al., 2018; Winterheld, 2016), present literature has not addressed these associations in both members of relationship dyads using counterbalanced self-report measures. The current study will examine the associations between insecure attachment styles and emotion dysregulation among couples in romantic relationships. This study will employ a cross-sectional survey design with a sample of approximately 84 dyads of college students to obtain a medium effect size ($r = .30$) and a power level of 80% (Faul et al., 2007). It is hypothesized that individuals with lower levels of anxious and avoidant attachment tendencies will also report fewer difficulties with emotion regulation strategies, and couples are expected to report a high degree of similarity on both measures relative to each other. These anticipated findings would align with the similarity hypothesis that individuals choose dating partners with the same attachment style as themselves (Strauss et al., 2012) and the concept of assortative mating, that individuals seek partners with similar traits to their own (Macrae et al., 2008). Results will be analyzed with a series of Pearson’s correlation coefficient ($r$) tests to examine associations between variables at the individual level and to determine the degree of nonindependence, or the extent of similarity between the two members of the dyadic unit.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Chloe Woodling
Psychological Science
College of Sciences and Humanities

Resilience and Attrition Rates of Women in STEM Occupations

Despite a considerable increase in women entering the workforce, they currently only hold around 24% of STEM jobs (Beede et al., 2011). These gender disparities in occupation may greatly have to do with attrition rates of women in STEM fields (Beasley & Fischer, 2012; Lawson, 2020). These attrition rates may be due to sexism and other various stressors associated with being in male-dominated occupations (Torre, 2017). It is important to understand differences between women who stay in STEM and those who leave to assist in addressing the gender gap in STEM occupations. While there are explicit distinctions between all individuals (regardless of gender), it has been found that individuals with high levels of resilience are more likely to cope well with various adversities (McAllister & McKinnon, 2009). Based on these findings, it is hypothesized that women with STEM degrees working in STEM occupations will have higher levels of resilience than women with STEM degrees working in non-STEM occupations. By determining whether resilience is a protective factor for women in STEM, we may be able to begin building level of resilience from a young age. The study will be advertised on various social media websites linking participants to a Qualtrics survey where they will be asked to fill out the Connor-Davidson Resilience Scale along with various demographic questions such as education (e.g., STEM degree). An independent samples t-test will be conducted to examine differences in resilience between women with STEM degrees who stay in STEM and those who leave.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Development of the Impulsive Action Questionnaire

Impulsivity is empirically associated with externalizing psychopathology such as substance use (Berg et al., 2015), antisociality (Whiteside et al., 2005), ADHD (Winstanley et al., 2006), and internalizing psychopathology such as fear and distress disorders (King et al., 2018), Borderline Personality Disorder and Bipolar Disorders (Henry et al., 2001). The widely used UPPS-P Model of Impulsivity suggests the construct of impulsivity reflects: Urgency (positive and negative), (lack of) Perseverance, (lack of) Premeditation, and Sensation-seeking (Lynam et al., 2007). Arguably the least well understood and most consequential facet of impulsivity is Urgency; the propensity to partake in rash action under the influence of intense positive or negative emotion (Whiteside & Lynam, 2001; Cyders & Smith, 2007). A key gap in our understanding of these mechanisms is if Positive and Negative Urgency are two separate constructs, or if they represent two variations of the same underlying mechanism. One way to evaluate if Urgency is one or two separate constructs is to see if individuals take different specific impulsive actions in the face of positive versus negative affect. As such, this study proposes the development of a scale to assess specific categories of behavior empirically associated with impulsivity. This study will gather one round of data, via Amazon’s Mechanical Turk, of participants’ level of trait impulsivity, the types of impulsive actions they have taken in the last 30 days (ranging in three levels of severity; mild, moderate, severe), and how problematic those actions were to their long-term goals.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Colin Thomas, Michael Domaracki, Levi Connelly & Ryan Slack

Computer Science
College of Sciences and Humanities

Automating Access Control for a Custom E-Commerce Platform

Zoom App is a company who provides educational material for athletes and athletic officials. Since 2015, their main clientele have been large organizations; however, during the COVID-19 pandemic, Zoom App started serving customers at a smaller scale, with their new RefPrep course series. With a larger customer base, the task of managing payments and access to content became too much for one person to do. Creating a seamless, headache-free experience for customers buying content online has always been a challenge, especially when it comes to digital products, such as SAAS (software-as-a-service). From a customer perspective, the purpose of this project is to fully implement an automated access control system which allows customers to securely pay for digital content from our client and receive immediate access to new subscriptions. From a client perspective, the goal is to completely remove any intermediate steps required for the client to receive payment and grant customers access to purchased content.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities

*Daniel Spencer

Modern Languages and Classics
College of Sciences and Humanities

Beauty in Ruins

What constitutes beauty? Do we only find beauty in places that society tells us are beautiful? In this project, I address these questions and explore the idea of finding beauty in dilapidated places. This project consists of photographing 8 urban ruins, editing the photos, and then composing 8 ekphrastic poems to further amplify and expand on the photos’ meanings. By exposing the viewer to these derelict scenes, I hope to recalibrate the viewer’s own standards of beauty. I aim to shed light on the hidden beauty I see amongst these evident ruins.

Faculty Mentor: Charlie Geyer
College of Sciences and Humanities
*Daniel Council*

Geography

College of Sciences and Humanities

**A Geographic Approach to Understanding Crime in Indiana**

Crime mapping is a nearly 200 year old discipline used by geographers, criminologists, and analysts to study criminal patterns and trends. As crime data has become more readily available to the public through online services such as the FBI’s Crime Data Explorer, the potential for crime mapping has grown extensively. Furthermore, the development of Geographic Information Systems has allowed for crime mapping to be done digitally, with a multitude of mapping and analysis methods being employed. The purpose of this thesis is to highlight how crime mapping has developed and provide an example of how it can be performed by focusing on crime in Indiana. Through visual methods such as tables, charts, and maps, the reader should ultimately gain a better understanding of crime in Indiana and how the state’s police agencies use Geographic Information Systems.

Faculty Mentor: Jorn Seemann

College of Sciences and Humanities
The Effectiveness of Biochar in Agricultural Amelioration of Martian Soil Simulant

Rising populations lead food availability to become a pressing concern. The need for more efficient food production is therefore a poignant area of study. Some believe the best answer is extraplanetary colonization. The soil of Mars has been studied for its possibility of supporting agriculture and has been found to support the essential nutrients needed for plants to grow. While the Mars soil contains the necessary nutrients, the concentrations are not high enough to sustain enough crop growth for humans to survive, therefore fertilizers will be required.

Biochar, produced through incomplete burning in partial or total absence of oxygen, enhances nutrient retention due to its high cation exchange capacity (CEC) and high surface area. The application of biochar to the soil has been shown to increase productivity, crop yield, soil microbial biomass, and reduction in nutrient leaching. This project will study the effects of adding biochar to Mars soil simulant on the retention of essential nutrients. The addition of biochar as an amelioration to the Mars soil may be a solution to the nutrient challenge in successfully growing crops on Mars.

Faculty Mentor: Jessi Haeft
College of Sciences and Humanities
Serotonin suppresses Drosophila serotonergic axon development in vitro

Funded by IAS Senior Research Grant

Serotonergic neurons modulate brain activity by releasing the neurotransmitter serotonin onto other neurons through long cable-like processes called axons. In order to successfully do this, axons from serotonergic neurons must precisely reach target neurons. If not achieved, malformed serotonergic axons can cause behavioral disorders impacting mood, sleep, and appetite. Assisting in this, serotonin regulates the development of axon structure in addition to its role as a neurotransmitter. Neurons unable to synthesize serotonin develop more branches and longer axons, suggesting it normally limits branching and elongation. Despite this observation, the molecular mechanism of this process, termed serotonin autoregulation, remains unknown. Here we developed a novel culture method allowing identification and analysis of developing primary Drosophila serotonergic neurons. To validate the utility of the culture system, we treated them with extracellular serotonin and found that high levels of serotonin inhibited axon growth. This is the first demonstration of serotonin autoregulation in a culture system, and combined with the powerful genetic tools available in Drosophila will provide exciting new insights into the molecular mechanism of serotonin autoregulation of serotonergic axon development.

Faculty Mentor: Douglas Roossien
College of Sciences and Humanities
Ellen Doss
Biology
College of Sciences and Humanities

Protein Quality Control in Candida albicans

Funded by Rubenstein R15 NIH Grant

Candida albicans is an opportunistic fungal pathogen that resides as normal flora in the human gastrointestinal tract and mouth. However, upon a patient's immunosuppression due to a preexisting condition or an organ transplant, the yeast can colonize nearly every tissue and organ, causing life-threatening infections. Few treatment options exist for Candida infections; therefore, it is essential to understand the molecular mechanisms that contribute to its virulence. We are characterizing the roles of four genes involved in protein quality control, which is uncharacterized in C. albicans. Using CRISPR, we are generating homozygous deletions of HRD1, DOA10, UBC7, and STE24. These knockout strains are being characterized and compared to wild type yeast using growth assays to determine how well they grow in the presence of compounds predicted to increase the abundance of misfolded proteins. A virulence assay will then be performed utilizing a characterized insect infection model, Galleria mellonella wax moth larvae. Survival of larvae injected with each knockout strain will be compared to that of larvae injected with the highly virulent wild type strain. These experiments represent a novel investigation of protein quality control in C. albicans and have the potential to reveal new therapeutic targets for fungal infections.

Faculty Mentor: Eric Rubenstein
College of Sciences and Humanities
Elli Cole
Psychological Science
College of Sciences and Humanities

Graduate students’ health insurance needs: The relationship to depression, anxiety, and perceived stress

Graduate students frequently report intense stress which contributes to susceptibility to mental health difficulties (Evans et al., 2018; Marks et al., 2011). They are six times more likely to experience depression or anxiety than non-graduate students. Many seek psychological treatment and 50% report considering seeking mental health services (Hyun et al., 2006). However, 46% cite financial constraints as a barrier to receiving services (El-Ghoroury et al., 2012). Currently, there is no research on graduate students’ health insurance, despite potentially being an underinsured population at risk for poor mental health. It was hypothesized that lack of health insurance would predict greater stress, depression, and anxiety in graduate students. Data was collected from graduate students at Ball State University (N = 65), who answered questions about health insurance, depression, anxiety, and stress. The results indicated 21% of students did not have health insurance. A multivariate analysis of variance was used to assess how a lack of health insurance was associated with depression, stress, and anxiety. The results suggested there were significant differences between the groups F3,61 = 334.67, p < .001 and lack of health insurance accounted for 13% of the variance in depression, stress, and anxiety. Discriminant analysis suggested that depression was most strongly associated with differences between groups (.67) followed by stress (.25) and anxiety (.01). The need for health insurance and the mental health of graduate students is discussed.

Faculty Mentor: Anjolii Diaz
College of Sciences and Humanities
Emily Hayes
Environment, Geology, and Natural Resources
College of Sciences and Humanities


Funded by ASPIRE Internal Grant Program

Environmental peacebuilding is an emerging field representing a paradigm shift from associating environmental problems as sources of conflict to using natural resources as a potential catalyst for building peace within and among communities. Threats of climate change and increasing foreign tourism have extraordinary impacts on drinking water quality and availability for the indigenous and local people of the Sagarmatha National Park (SNP), Nepal. The purpose of this study is to expand on six years of previous water quality research of the SNP, focusing on local indigenous water management practices and the dynamic relationship between water management and peace. Using a mixed-methods research approach, this study intends to: (1) understand local perceptions and attitudes regarding water resource management; (2) identify possible conflicts associated with water resources; and (3) develop community action strategies and a community-based plan of action to address water quality issues related to conflict. The methodology used in this study to conduct conflict analysis and understand local perceptions of water management in the SNP includes: extensive literature review, key informant (KI) interviews, tourist and household surveys, and annual focused community discussions. Introducing peacebuilding tools into the existing water management framework in the SNP can facilitate conflict prevention, mitigation, resolution, and recovery that will build Sherpa community resilience. The goal of this research is to conduct result producing water management assessments that honor the unique language, culture, and history of the Sherpa community.

Faculty Mentor: Joshua Gruver
College of Sciences and Humanities
The role that food plays in film typically has more meaning than a viewer might realize at first. Often viewers watch movies for entertainment without analyzing the context that the food in each scene provides to the richness of the plot. For example, Bong Joon-ho’s 2019 award-winning film Parasite thrills its audience while warning them about the dangers of capitalism and class disparity. Despite the popularity of this film, the aspect of food was quietly forgotten even though it enhances the movie’s theme. Bong intentionally placed food in this film to signify class status which further divides the Park and Kim families. While this is a critically acclaimed film, there is not much scholarship devoted to food studies concerning social class in Parasite; therefore, I am drawing upon movie reviews as well as scholarly work about food in media. In doing this, I have studied Parasite through lenses of socio-economic theory as well as food theory to analyze how food is used in the film. Food involves more than simply preparing ingredients and consuming the final product, especially when used in media and popular culture: it often provides deeper meaning that must be examined in order to know what is truly being said. In the film Parasite, food is the vehicle that Bong uses to signify social status, and furthermore, it signals class disparities between the wealthy and impoverished. Beyond the film, Bong uses food to warn his audience how class inequality could be the downfall, the parasite, of society.
Hot Button Issue: Material Composition Analysis of Archaeological Ceramic Buttons

Button production provides interesting insight into industrial methods and clothing history. This research analyzed 10 buttons recovered from an archaeological site for composition. The buttons were excavated from an unmarked 19th century African American cemetery in Lowndes County, Mississippi. Each button was sampled, and infrared spectra were obtained for each sample using Fourier Transform Infrared spectroscopy. The unprocessed spectra were deconvolved, and a fourth derivative of spectra were obtained to check the validity of the peaks. Replicate spectra of each button were also obtained. Preliminary project results indicate that the majority of button samples may be composed of a mixture of three different types of feldspars, a group of technological minerals: orthoclase, microcline, and albite. Reference spectra for each feldspar type is very similar and makes distinct feldspar identification difficult. The spectra data indicate that these buttons date to the period when Prosser buttons were commonly used for clothing. Unlike the higher-quality Prosser buttons that were often made from ground quartz, these buttons were likely made of ceramic wasters, including a combination of the aforementioned feldspars. These results contribute to the field of feldspar identification, material composition identification of archaeological artifacts, and the production profile of buttons dating to the Civil War period.

Faculty Mentor: Patricia Lang & Homes Hogue
College of Sciences and Humanities
Eric Wilken
Mathematical Sciences
College of Sciences and Humanities

The Impact of Grant Funding on Economic Growth in Ohio: A Spatial Approach

Economic growth is not distributed uniformly across a country or state. In the United States, between 1975 and 2015, there has been growing inequality between the development of rural and urban areas alongside increasing rates of rural poverty (Hertz & Silva, 2020). This has led to an increasing difference in the standards of living for citizens residing in close proximity within the same state. This presentation is about investigating how the allocation of state grant funding impacts economic development specially in the state of Ohio. Data were retrieved from existing economic and demographic data sets available through the US Bureau of Labor Statistics and the US Census Bureau. The data were analyzed to consider the spatial interaction between counties. Spatial effects are intentionally considered as the economic activity within cities can impact the economic activity in surrounding rural areas (Henry & Drabenstott, 1996). Spatial effects were captured by conducting regressions utilizing the OLS model, spatial error model, spatial lag model, and spatial Durbin model, then comparing their predictive accuracy.

Faculty Mentor: Rebecca Pierce
College of Sciences and Humanities
*Erin Kaihara

Psychological Science
College of Sciences and Humanities

Evaluations of Applicants for a Leadership Position in a Male-Dominated Academic Field: The Role of Gender and Race

The current study will analyze how gender and race play a role in the hiring process of candidates for a male-dominated position in academia. Specifically, this research will look at how Hispanic/Latinx individuals compare with White individuals when applying to be the head of a computer science department at a university. Using the Goldberg-paradigm methodology, participants will be shown a fictitious resumé for a candidate and asked about the candidate’s perceived hireability, likeability, competence, and warmth. Participants will also be asked to assign the candidate a salary from a list of options.

Faculty Mentor: Katie Lawson
College of Sciences and Humanities
Esther Atutey

Biology

College of Sciences and Humanities

Determining the Effects of Precipitation and Pollution on Fish Communities and Stream Conditions within the West Fork White River

Various human activities such as pesticides and fertilizer products on farmlands, exploitation of crude oil, burning fossil fuels, construction, and even waste disposal have contributed to the significant increase in climate change. Precipitation has washed these products into streams and water bodies which invariably pollute and affect various aquatic lives such as fish. Therefore, the need to monitor water pollution and precipitation impact. The purpose of this study is to determine the effect of precipitation and pollution on fish communities and stream conditions within the West Fork White River. Using a mixed-methods research approach, this study intends to: (1) Evaluate the health of fish communities; (2) Evaluate overall water quality; and (3) Report the results in a manner that is useful to the audience. The analysis will be conducted using existing data collected and recorded from the West Fork White River. The data will be summarized based on water chemistry samples and fish communities. The fish community sample results will be assessed using the Index of Biotic Integrity (IBI), which would determine the fish community's overall health.

Faculty Mentor: Mark Pyron

College of Sciences and Humanities
**Hunter Line, Samuel Guernsey, Jacob Goelz & Jaden Drury**

Computer Science  
College of Sciences and Humanities

**Zooom Video Uploader and Offline Editor**

This project is an application for IOS Android MacOS and Windows designed to work as an offline version of the editing tools available on the Zooom website. In addition it allows videos to be uploaded directly from the application bypassing the additional upload time that would be required by uploading a video through the browser.

Faculty Mentor: Huseyin Ergin  
College of Sciences and Humanities

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**Hunter Wallace, Chase Watkins, Nathaniel Barber & Luke Holliday**

Computer Science  
College of Sciences and Humanities

**24x7 System Monitoring**

The 24x7 System Monitoring project revolves around the concept of monitoring API status calls and being able to alert a user via text/email if a certain conditional is triggered. This eliminates the responsibility of someone being up overnight to watch certain business processes happens and can instead just be alerted when an alert is received. The software is completely customizable and can accept any API call and be displayed in a simple and easy to read dashboard.

Faculty Mentor: Huseyin Ergin  
College of Sciences and Humanities
Ian Roesler
English
College of Sciences and Humanities

The Texas Chain Saw Massacre, Cannibalism, and Hillbilly Horror: How America Eats Itself

An analysis of Tobe Hooper’s The Texas Chain Saw Massacre and how it relates to food studies, in particular food deserts, cannibalism, and rural life.

Faculty Mentor: Emily Rutter
College of Sciences and Humanities

*Isabelle Wright
Biology
College of Sciences and Humanities

Olfactory Recognition in Brain Glycogen Knockout Mice

Glucose stored in the brain as the branched polysaccharide glycogen plays a role in learning by providing neurons with lactate. The effect of brain glycogen levels on sensory learning in mus musculus is rarely studied and, as a model species for human studies, has implications for learning in people with abnormal levels of insulin. Wild-type mice and mice without brain glycogen were allowed to smell a fruit juice for 5 minutes after a habituation period. 24 hours later, the mice were allowed to smell the juice again. The amount of time the mouse spent “exploring” the novelty smell was measured in seconds on both days, and the times were compared between genotypes with the hypothesis that wild type mice would spend less time on a familiar smell 24 hours later than knockout mice. However, analysis of this data shows little difference between the two genotypes, implying that brain glycogen may not have a significant impact on sensory learning. When compiled with other behavioral studies with brain glycogen variables, this study improves understanding of the effect that mammalian brain glycogen levels have on behavioral learning.

Faculty Mentor: Bartholomew Pederson
College of Sciences and Humanities
Jacob Wade
Chemistry
College of Sciences and Humanities

Overcoming Synthetic Challenges with Single-Atom Linked Dithiolate Bridged [Fe-Fe]-hydrogenase Mimic Compounds

Due to their high catalytic turnover frequency, [Fe-Fe]-hydrogenase mimic compounds have been suggested as potential replacements for platinum in the catalytic reduction of water into hydrogen for fuel cells which has fueled significant research into these compounds. The natural enzyme is believed to be a three-atom azadithiolate (adt) linked complex. There is an abundance of literature for the two-atom or larger linked mimic compounds, however only a relatively small amount exists which covers the single-atom linked compounds. Through thorough study of the literature, we have been able to successfully synthesize two single atom linked compounds: methanedithiolate (mdt) diironhexacarbonyl and diphenylmethanedithiolate (dpmdt) diironhexacarbonyl, with hopes to apply these routes to synthesize novel compounds. Though we have successfully synthesized these compounds, we have had difficulty with purifying them, always obtaining impure material from the silica gel column. We have successfully replicated the synthesis of these compounds in adequate yields with multiple side-products but have received inconsistent results during purification. One major challenge with these compounds is that these compounds are extremely non-polar, quickly eluting with 100% pentane/hexanes. These compounds are highly soluble in these solvents which complicates attempts at recrystallization. The presentation herein highlights the challenges which we have faced, and the steps taken to successfully synthesize and purify these compounds and plans to apply the learned techniques to synthesizing novel compounds including: di-2-pyridylmethanedithiolate (dpymdt) diironhexacarbonyl and the nitrogen based aminodithiolate (ndt) diironhexacarbonyl.

Faculty Mentor: Jesse Tye
College of Sciences and Humanities
The Expansion and Further Development of a New Episodic Memory Task

Traditional episodic memory tasks utilize static images of objects, scenes, or words that do not mimic real-world memory experiences (i.e., they lack context). The contextual piece of information that is most frequently overlooked in current episodic memory research is the significance of the memory itself (i.e., why) (Leal et al., 2019). A recent study by Leal and colleagues (2019) developed a modified mnemonic discrimination task (MDT) using a set of naturalistic stimuli that included video clips of everyday experiences (e.g., positive, negative, and neutral stimuli). The current study aims to expand the development of Dr. Leal and colleagues’ (2019) modified MDT to establish its future use in an event-related potential (ERP) framework. Thus, we will expand the current data set used in the modified MDT to assess whether the additional videos and photos can elicit similar patterns as to what was established in the previous study (Leal et. al, 2019).

Faculty Mentor: Stephanie Simon-Dack
College of Sciences and Humanities
Jaymi Godfrey
Environment, Geology, and Natural Resources
College of Sciences and Humanities

Removal of Microplastics from a Wastewater Treatment Plant System

“Microplastic” includes tiny plastic fragments that are either resulted from plastic degradation or were manufactured that way. Microplastic waste is an contaminant of emerging concern for river systems, which is among the main sources of human drinking water supply. Previous studies have focused on the prevalence of microplastics within fluvial systems, and how microplastics impact wildlife and human health, mitigation techniques, and the existence in wastewater treatment systems. However, rates and mechanisms of microplastic removal during the wastewater treatment system process are still unclear. The focus of this study will be determining how much microplastics are removed per each stage of the wastewater treatment process, and reveal the temporal variations of the abundance of microplastic entering the Muncie Wastewater Treatment Plant (WWTP). This study will collect biweekly grab samples with duplicates which will be filtered using an assembled stack of sieves with mesh sizes between 400 and 74 µm, as well as using wet peroxide oxidation and density separation techniques to isolate microplastics. This study will also use visual identification to categorize microplastics based on morphology. Findings from this research will help the WWTP evaluate future renovations related to the removal of microplastics as well as contribute to cutting-edge knowledge in the field.

Faculty Mentor: Bangshuai Han
College of Sciences and Humanities
Elevated Plasma Creatinine Levels in Old Female Retinal Dystrophic Pigmented Royal College of Surgeon (RCS) Rats

The Royal College of Surgeons (RCS) pigmented rat is known as being an animal model for studying inherited retinal degeneration seen in humans. Often, kidney problems are seen with eye problems. There is no information on kidney function in this model. The purpose of this study was to investigate whether there are also kidney problems in this model. A decrease in glomerular filtration rate (GFR) is seen when there is kidney dysfunction and is usually accompanied by an increase in the plasma creatinine concentration. The plasma creatinine concentration was measured in four old female RCS rats and compared to the plasma creatinine concentration in four similarly aged female control rats. There was a significant increase in the plasma creatinine concentration in the old female RCS rats. This indicates that these rats are also exhibiting problems with their kidneys as well as their eyes.

Faculty Mentor: Marianna Zamlauski-Tucker
College of Sciences and Humanities
Pandemics and Athletics: How COVID-19 Affected Sport Injury Rehabilitation

This study provides insight to the common reactions of an athlete post-injury, interpersonal impacts on an athlete from both their injury and COVID-19, rehabilitation changes due to COVID-19, and a perspective from injured athletes on the current availability and effectiveness of mental-health resources. Twelve participants that identified with the study inclusion criteria (e.g., current NCAA athlete, 18 years of age or older, and experiencing or experienced an injury during the COVID-19 pandemic) volunteered for the study, but one dropped out before the completion of the study. Zoellner & Maerker (2006) found qualitative examination allows the researchers to utilize the injured student-athlete perspective in order to form a greater understanding of the experiences. After conducting semi-structured interviews in three groups, three themes emerged: (1) emotional stress, (2) impact on interpersonal relationships, and (3) delay in recovery. Subthemes were also identified to further expand the concepts illustrated within the main themes. This information provides value for athletic trainers, sport psychologists, social workers, and other physical and behavioral health providers working to promote the rehabilitation and well-being of an injured athlete during COVID-19.

Faculty Mentor: Matt Moore
College of Health
Jessica (Shelby) Harrison, Andrea Mohler, Julie Steele, Ben Jett & June Cooper

English
College of Sciences and Humanities

Designing and Publicizing The Digital Literature Review

Explaining the process of designing, formatting and publicizing the academic journal, The Digital Literature Review. Also known as the DLR, we as a student run journal edited and produced the journal with the theme of “Food Matters in Literature and Culture”. Through a process of teamwork and dedication the journal was advertised to the public through Instagram and Twitter. However, we will be discussing the whys and whats of the choices we made while creating the online journal. While also discussing the real-world experience that an immersive learning course, such as this one can impact the future of the students. What experiences we developed and how we can bring them into our future careers and how other students can benefit in joining these immersive learning courses available through Ball State University.

Faculty Mentor: Emily Rutter
College of Sciences and Humanities
*Joseph Trentadue

Psychological Science
College of Sciences and Humanities

COVID-19 and Mask Wearing Support: Using a Moral Psychological Framework to Influence Persuasion

Funded by the ASpiRE Internal Grant Program

Moral Foundations Theory proposes that there are five moral frameworks through which individuals view their world from: care/harm principles, fairness/cheating principles, loyalty/betrayal principles, sanctity/degradation principles, and authority/subversion principles. Research has shown that liberals are more likely to both endorse and utilize moral arguments that are based on the principles of care/harm and fairness/cheating, whereas conservatives are more likely to endorse and utilize moral arguments that are based on the remaining three principles. The current study analyzed the impact that moral framing could have on individuals who self identified as either liberal or conservative in relation to mask-wearing and the COVID-19 pandemic. Participants were asked to complete a questionnaire assessing perceptions of COVID-19 regarding individual concern and perceived threat of the virus. Participants were then asked to complete the right-wing authoritarianism scale as well as the social dominance orientation scale to assess participant’s leanings. Participants were then shown one of three messages regarding COVID-19, framed in either a harm avoidance and fairness moral framework or purity and ingroup loyalty moral framework. Participant’s level of persuasion was then assessed, by assessing how often participants intend to wear a mask and how likely participants would be to support a national mask mandate. Results of this study will contribute to previous research that shows moral framing of statements can influence persuasion among a population that might not be likely to support it.

Faculty Mentor: Andrew Luttrell
College of Sciences and Humanities
Redirecting the Blame: America’s Overconsumption of Black Women as Illustrated in Kiese Laymon’s Heavy

This essay delves into the overconsumption of the Black women within Kiese Laymon’s novel "Heavy" through the lens of triple consciousness and the deep effects of generational trauma as perpetuated by the white institutions which influence Black women to be treated in and respond in negative fashions. This essay analyzes the latest 2020 Black Lives Matter movement for further context of white power structures determining the lives of Black women and how they interact with food along with how they are consumed as sex objects and therefore have their bodies overindulged in.

Faculty Mentor: Emily Rutter
College of Sciences and Humanities
Translocons are molecular channels that allow proteins to cross membranes in a process called translocation. This enables proteins to reach their appropriate cellular locations to perform their specific functions. If translocons become clogged, they cannot be used as passages for other proteins. Unresolved translocon clogging may result in diseases, such as type 2 diabetes. There are two modes of translocation, posttranslational translocation (PTT) and cotranslational translocation (CTT). Errors can occur in both processes, resulting in clogged translocons. Ste24 is a conserved enzyme that degrades clogging proteins that enter the translocon via PTT. It is unknown if Ste24 also degrades proteins that use CTT. We tested the hypothesis that Ste24 degrades clogged proteins that undergo CTT, using a Saccharomyces cerevisiae model system. The abundance of proteins engineered to clog translocons during CTT was analyzed via western blot analysis in yeast containing or lacking STE24. We found Ste24 does not promote degradation of proteins that undergo CTT. These data contribute to the knowledge of how cells maintain functional translocons, suggesting translocon quality control enzymes exhibit strong specificity in the types of translocon-clogging proteins they degrade. Our results may have implications for understanding and treating diseases associated with translocon dysfunction.
Where's Your Mask? Distance Perception in Mask-Wearing

During the Coronavirus pandemic, much attention has been given to physical distance measurements, such as instructing individuals to stand 6 feet away apart. Tied to the pandemic, safety concerns have risen and created a sense of anxiety in those who are concerned about contracting disease. The introduction of masks has aimed to decrease this anxiety and improve the safety of others while in public spaces. Previous studies have addressed the role of fear and threat in perception, but research has not addressed whether safety measures (such as masks) will impact distance perception of individuals. The current study addresses this gap by conducting two experiments. The first experiment addresses the role of mask wearing on perception. Participants will be asked to identify the size of a virtual character from 10 silhouettes. The virtual character will be depicted as either wearing a mask or not. The second experiment will address the role of familiarity and mask wearing on perception. Participants will be given a sort scenario depicting two virtual characters as either friends or strangers. Participants will then undergo the same size matching procedure as in the first experiment, and each of the virtual characters will be depicted as wearing a mask or not. Addressing this research will provide individuals with a greater knowledge of perception, and therefore, will provide more information on how individuals process their surroundings in threatening environments, such as the Coronavirus pandemic.

Faculty Mentor: Daniele Nardi
College of Sciences and Humanities
Keldyn Young

Psychological Science
College of Sciences and Humanities

Emotional Support Among College Students

According to social support theories, peer and familial support can play an important role in an individual's life and even serve as a protective factor. First-generation college students are a vulnerable demographic in terms of stressors and tend to have less encouragement from family to attend college. The current study will examine emotion regulation, academic achievement, & self-efficacy among first-generation and continuing-generation college students in order to help elucidate the role of peer and familial support. This study is in the process of data collection.

Faculty Mentor: Anjolii Diaz
College of Sciences and Humanities
Anisomycin is an antifungal drug that represents a potential therapeutic target for PTSD and cancers. It interrupts protein synthesis by causing the ribosome to misread mRNA. This causes proteotoxic stress. The model organism Saccharomyces cerevisiae was used to observe the effects of certain genes in responding to anisomycin. Surprisingly, even though anisomycin leads to proteotoxic stress, some yeast strains containing deletions of genes known to cope with stress were resistant to anisomycin. The goal of my project was to characterize the effect of these gene deletions in presence of anisomycin. To do this, a series of growth assays were performed with different strains in the presence and absence of anisomycin. Further experiments indicated that how, rather than which, genes were knocked out of the genome was at least partially contributing to the resistance observed in these strains. This result is significant because it reveals a flaw in a commonly used technique in yeast biology. This technical flaw could change how scientists approach future experiments involving anisomycin. Future experiments will be performed to determine how much of the resistance can be attributed to how genes are knocked out versus which genes are knocked out.

Faculty Mentor: Eric Rubenstein
College of Sciences and Humanities
Krista Price
Psychological Science
College of Sciences and Humanities

Mindfulness Influence on Interhemispheric transfer: Does Mindfulness Reduce Global Interference for Information Processing?

Extensive research has investigated how mindfulness impacts cognition and well-being. However, there has been no research that has looked at how mindfulness may influence Global and Local information processing. Global and Local processing is a lateralized cognitive function that helps individuals perceive and conceptualize the world. Additionally, engagement in more Local processing has been linked with individuals with depression and anxiety. The current study is a pilot study to establish a trend in mindfulness and Global and Local processing. Participants were tasked to take the Mindfulness Attention Awareness Scale (MAAS) which assessed trait mindfulness by measuring receptive awareness and attention to the present. The participants then completed a Navon task which assessed accuracy for correctly engaging Global and Local processing.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Computerized Analysis of Linguistic Style Differences Between Offenders of Mass Shootings

Legacy tokens, artifacts written by offenders of mass shootings, provide a window through which violent behavior can be examined from the perspective of the offender. Many previous studies have investigated legacy tokens qualitatively, yet surprisingly few have conducted computerized text-analyses. Further, past work has yet to evaluate text-based differences between types of offenders, principally between those who commit suicide or survive a mass shooting event. The present study intends to use a quantitative approach to exploring these differences by using the closed-content, text analysis software, Linguistic Inquiry and Word Count (LIWC). To accomplish this, legacy tokens will be harvested from an online database, verified by at least one other internet source, and submitted to LIWC for analysis. Legacy tokens between offender types will be compared based on language style categories shown to indicate emotionality, cognitive complexity, and attention allocation.

Faculty Mentor: Thomas Holtgraves
    College of Sciences and Humanities
Translocation Through the Endoplasmic Reticulum Translocon is Impaired by Translocon Modification

Funded by the ASpiRE Internal Grant Program

The endoplasmic reticulum (ER) is the entry point for most proteins residing and functioning in the eukaryotic endomembrane system. The primary mechanism by which proteins enter the ER is via the translocon complex. Dysfunction in this complex can block access into the ER, which is detrimental to cellular health. The translocon is highly conserved and has been intensely studied in Saccharomyces cerevisiae. Analysis of translocon function in protein trafficking, localization, and interactions in yeast has been facilitated by the use of epitope tags. We have found that a tag on the translocon pore subunit previously suggested not to impair translocon function subtly affects translocation of proteins into the ER in yeast cells. Intriguingly, this tag also suppresses a phenotype associated with defective protein quality control pathways, consistent with a functional link between translocation and quality control. Ongoing work includes characterizing the effects of placing different epitope tags on different translocon subunits, with the goal of identifying tags that affect translocon function the least.

Faculty Mentor: Eric Rubenstein
College of Sciences and Humanities
Lauren Szymczak

Psychological Science
College of Sciences and Humanities

The relationships among dimensions of test anxiety and standardized math exam performance

Funded by the Teacher-Scholar Program

In a study of 128 undergraduate volunteers, the influence of activating test anxiety on decreasing performance in a standardized math test was evaluated. Using a pre-test and post-test design, students completed two versions of a standardized math exam. Between the two math tests, they completed a test anxiety battery, including the Reactions to Tests Scale (Sarason, 1984) and the Cognitive Test Anxiety Scale (Cassady & Johnson, 2002). Analysis will focus on within subjects differences between the two math test performance scores based on levels of test anxiety. Of particular interest is the influence of different dimensions of test anxiety on overall math performance as well as changes in math performance based on the activation of test anxiety. The results of hierarchical regression analysis will allow us to test the additive model of test anxiety (Zohar, 1998) by investigating both state anxiety and trait anxiety components simultaneously. The discussion section will allow for an explanation of how different forms of test anxiety influence test performance in various ways.

Faculty Mentor: Jerrell Cassady
Teachers College
Lauren Andrews & Kwabena Duah

Chemistry
College of Sciences and Humanities

Synthesis of a Simplified Open-Chain Analog of Ipomoeassin F

Most resin glycosides exhibited only moderate inhibition activity against cancer cell growth. However, ipomoeassin F is exceptionally cytotoxic. To accelerate ongoing chemical biology research on ipomoeassin F, we are synthesizing a novel simplified open-chain analog 1 from commercially available D-glucose and L-arabinose based on previous structure-activity relationship (SAR) studies. We expect that biological assessment of analog 1 would direct future design of ipomoeassin - derived chemical probes for studying biological pathways related to protein biogenesis.

Faculty Mentor: Wei Shi
College of Sciences and Humanities
TEMPERATURE CONTROLS ON MICROCYSTIN DEGRADATION

Toxic cyanobacteria blooms are increasing in frequency and severity with rising surface-water temperatures. Warming generates a positive feedback on harmful algal bloom development by promoting toxic cyanobacteria over non-toxic strains, stimulating toxin synthesis, and subsequently triggering toxin release. The release of cyanotoxins into the water column poses a serious threat to water quality and human health. Yet, cyanotoxins rarely accumulate in the water column long-term, suggesting that biodegradation by heterotrophic bacteria may play a role in the removal process. Owing to increased metabolic rates at higher temperatures, microbial-mediated degradation of cyanotoxins may be influenced by warming. However, the effect of warming on the uptake and subsequent biodegradation of cyanotoxins has not yet been evaluated. In this study, we evaluated the ability for heterotrophic bacteria to degrade microcystin produced by a common cyanobacterium, Planktothrix agardhii, across a natural temperature gradient (from 5 to 20°C) during a laboratory incubation experiment. We measured microcystin concentration and bacterial abundance at 0, 6, 12, 24, 48, 96, and 192 hours. We found that microcystin concentration declined over time in all temperature treatments and degradation increased with warming. Patterns of microcystin degradation corresponded with increases in bacterial cell density over time that were enhanced by warming. These results suggest that cyanotoxins can be reduced by microbial-mediated degradation and the rate of cyanotoxin degradation increases with water temperature.
Martina Schiavo

English
College of Sciences and Humanities

Benefits on Listening and Speaking in Learning English through International Programs’ Activities

The paper discusses the alignment of learning objectives with speaking and listening skills, materials, and assessments. They are developed through participation in international students’ presentations with their faculty studying at the Intensive English Institute (IEI). These presentations are part of social events organized by the International Office called Rinker Center for International Program (RCIP) at Ball State University in Muncie, Indiana. The goal is to improve speaking and listening skills, the most difficult to develop in classroom activities. The methodology was based on a survey measuring the efficacy of the objectives addressing speaking and listening skills. The survey results conducted among instructors provided clear evidence that future participation in these events will consolidate cultural knowledge, pronunciation, and taking notes skills in front of a speaker despite time constraints of the IEI. These results were valid in alignment with the learning objectives of speaking and listening. Regarding the material to prepare ahead and the assessments, relevant ideas were pointed out both in the close-ended and open-ended questions. This research is framed in the more general importance of a collaboration between the English Institute of a university and the International Office because many international students attending a university in the US at least in Indiana attend the English Institute. This collaboration becomes essential in building students’ intercultural competence and communicative skills to succeed both in real life and at the academic level.

Faculty Mentor: Megumi Hamada
College of Sciences and Humanities
Enterprise Virtual Exchange (EVE)

A place for small businesses to sign up and providers (like a bank, library, etc.) to sign up as well. A matching place based on the interests of these two. Small businesses can take classes, talks, seminars, check articles. EVE assistant can answer some questions. The Enterprise Virtual Exchange (EVE) brings key resources to entrepreneurs enabling them to realize their visions and build social capital. Enterprise Virtual Exchange (EVE) is a comprehensive and user-friendly platform that delivers illuminating connections between entrepreneurs, business owners, and specialized resources providers. EVE brings virtual training, networking, and special events to the entrepreneurs. Many small business owners spend the bulk of their time working their business and find it difficult to leave the shop to participate in activities that provide information and opportunities for business ideation, growth, and operational management. Therefore, we partner with small business advocates, certified Community Development Financial Institutions, and other small business resource providers to customize knowledge for business acumen and bring to the end-user on an easily accessible platform. EVE provides a direct connection through candid shared communication. The mission of EVE is to bring wisdom, key resources, and purposeful networking to build social capital and create space for innovative growth. EVE is a two-part virtual exchange marketplace: Educational resources for business owners include best practices for financing, industry standards, vendor management, organizational ideation, and legal matters. A bridge between companies, investors, and executive groups, with the necessary resources to catapult their businesses.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Nicholas Burrell, Eli Sokeland, Joshua Johannsen & Brayden Gates

Computer Science
College of Sciences and Humanities

A Design on Rating Apprentices and Analyzing Growth

Through the use of this project, an individual in a company will be able to create new users (designating them as an apprentice, full-time employee, or admin) on the service, add new ratings to each user in specific categories that an admin or a full-time employee creates, view the overall ratings of all users, and will allow admins and full-time employees the ability to view a specific apprentice's individual ratings in each category with a graph that shows the ratings over time to see if an apprentice is getting better at the skills they are developing in the workplace.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Nick Mundell, Anna Harp, Lauryn Jones, *Audrey Hasser, Jon Sorgenfrei & Mary Scott

Psychological Science
College of Sciences and Humanities

Gender Differences in MMPI-2-RF Scale Scores in College Students

Internalizing disorders are characterized by several negative symptoms including stress, anxiety, mood instability, and low positive emotions (Ben-Porath, 2012; Duffy et al., 2017). The literature suggests that more females than males are diagnosed with internalizing disorders (Nolen-Hoeksema, 1994). One mechanism that has been supported as influencing this difference is that society and gender stereotypes encourage females and males to express emotions differently (Rosenfield et al., 2000). One specific area within the internalizing spectrum where we may see societal norms leading to sex differences is anger proneness. Anger proneness (ANP), as measured by the MMPI-2-RF ANP scale, is the tendency to become easily angered, upset, or impatient with others (Ben-Porath, 2012). Indeed, there is evidence to suggest that males tend to express anger more externally whereas females tend to express anger more internally (Dawson et al., 2010).

Despite past research on sex differences in internalizing disorders, previous literature has not examined sex differences in anger proneness as measured by the MMPI-2-RF ANP scale. Thus, the current study will examine whether sex differences exist on the MMPI-2-RF ANP scale. More specifically, we hypothesize that males will score higher than females on the ANP scale. To achieve this goal, we will use an archival dataset of college students who score higher than average on the MMPI-2-RF Emotional/Internalizing Dysfunction scale. We will conduct a reliability analysis on the ANP scale for each sex followed by a t-test, including assumption checking, to assess whether sex affects ANP scale scores.

Faculty Mentor: Tayla Lee
College of Sciences and Humanities
Bengali-English Code-switching on Facebook: Features and Frequency

The world has been exposed to English in wider measure than ever before due to its huge role in technology and electronic communication. Due to this extensive contact with English, variation in the language in social media has resulted. Code-switching is one such result. The focus of this exploratory study is to analyze the nature of Bengali-English code-switching in language use in the social medium Facebook, by Bengali speakers from Bangladesh. In order to do that, this study examines the features and frequency of Bengali-English code-switching on Facebook. Specifically, it analyzes the use of lexical items, phrases, and the frequency of switching. Bengali-English code-switching has been explored very little. Alam (2006) points out a few factors that motivate code-switching. Khadim (2014) investigates the motivation behind this practice focusing on the specific situations that might encourage code-switching. Tasnim (2018) investigates the frequency of code-switching based on a very small amount of data. My study aims to fill some gaps in previous research by examining the main features of code-switching along with the frequency of the words and phrases used. A mixed methodology has been used to fulfill the objectives of the research. Data was collected through a survey questionnaire and close observation. Ten active users of Facebook have been chosen as participants through the snowball method for close observation. The data analysis yields result suggestive of the frequency and types of code-switching and their patterns of switching in language use on Facebook in terms of lexical, morphological, and syntactical properties.

Faculty Mentor: Elizabeth Riddle
College of Sciences and Humanities
*Noah Ziems, Alan Bauer & *Andrew Thomas

Computer Science
College of Sciences and Humanities

LeadSigma: A Solution for Lead Response Time

Harvard Business Review states that new leads should be responded to within 5 minutes to optimize the lead opportunity. In contrast, most businesses take over 24 hours on average to reply to any given lead. This presents a unique business opportunity. In this work, we showcase LeadSigma, a novel workflow that allows any business to respond to new leads. Moreover, we show that with LeadSigma companies can increase their lead opportunity by orders of magnitude.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Attributions of Responsibility for a Fictional Account of Sexual Assault

Research into attitudes toward sexual assault has primarily focused on the influence of rape myth adherence and sexist beliefs, as well as the impact of the survivor’s behaviors and characteristics. The current research analyzes how a perpetrator’s ascribed social status influences participant’s attributions of responsibility to either the perpetrator or the survivor, as well as how observer gender impacts attitudes. I predict that if an observer (i.e., a participant) is a stranger to both the perpetrator and the survivor, they will be more likely to assign responsibility for the assault to the survivor if the observer identifies as male and if the perpetrator was of a higher social status. 250 participants were recruited through the research platform Prolific. A 2x2 design was used to randomly assign participants to one of two conditions, one being a high perpetrator status and the other being a low perpetrator status. They were asked to read a fictional account of sexual assault and responded to a series of questions regarding their perceptions of who was responsible for the incident; the primary measure for the study will be the MacArthur Scale of Subjective Social Status. Participants were also asked a series of demographic questions, as well as their beliefs regarding certain moral questions.

Faculty Mentor: Andrew Luttrell
College of Sciences and Humanities

Funded by the ASPIRE Internal Grant Program
*Phillip Betts

Chemistry
College of Sciences and Humanities

Development and Application of High Throughput Assay Systems for the Detection of Rieske Dioxygenase Activity

Funded by the Indiana Academy of Science Senior Research Grant

Rieske dioxygenases are a class of enzymes found in soil bacteria, that are known to catalyze aromatic compounds via dihydroxylation to form enantiopure cis-diol metabolites. The regio-/stereoselective nature of enzymes make it a promising tool for synthetic chemistry by discovering new methods to form complex compounds.

Enzymes can be an environmentally friendly alternative to traditional catalysts by eliminating the need for petroleum based solvents, as enzymes can perform in aqueous solutions, and toxic heavy metals. However, enzymes are limited by their substrate scope and strict selectivity. In order to overcome this, protein engineering has been employed to expand the reactivity of enzymes.

To detect the activity of engineered dioxygenases, a novel assay system for the detection of aromatic substrate metabolites was developed. Here, the cis-diol metabolite was oxidize to form dialdehydes. These aldehydes can then conjugate with a fluorescent probe to give a strong fluorescent signal. However, this metaperiodate fluorescein cis-diol assay (MPFCD) does not give a strong fluorescent signal with aliphatic substrates. Thus, optimization of an assay for aliphatic dihydroxylation for metabolite detection via absorbance was investigated. These throughput assays can allow for distinct determination of engineered Rieske dioxygenase variants that show improved reactivity towards substrates not native to the enzyme.

Faculty Mentor: Jordan Froese
Graduate Mentor: Cristina Preston-Hererra
College of Sciences and Humanities
Reader Goals and Working Memory Capacity on Drawing Generalization Inferences

Research based on the effects of working memory capacity (WMC) and reader goals on drawing generalization inferences, have yet to be studied in the field. This current study suggests that applying different reading goals with differences in WMC will have an effect on reading processes such as generalization inferences. Linderholm and van den Broek (2002a, 2002b) suggested that both high and low-WMC students adjusted their reading processing based on reader goals, though have different cognitive strategies when doing so. Identifying how generalization inferences are affected in regards to WMC and reader goals may extend our knowledge of these cognitive strategies. The integration of these ideas has created a new avenue to better understand the processing of reading. Thus, the purpose of this study is to study the interaction between working memory differences and reader goals on reading processing, specifically in generalized inference making. We hypothesize that individuals with lower working memory will draw less generalization inferences, regardless of reader goal. We also hypothesize that low-WMC with the study reader goal will draw the least amount of generalization inferences compared to the entertainment reader goal. Additionally, we hypothesize that individuals in the high-WMC group will draw more generalization inferences in the study reader goal than the entertainment reader goal.

Faculty Mentor: Kristin Ritchey
College of Sciences and Humanities
Samantha Turk

Biology
College of Sciences and Humanities

Determining the Role of a Transcription Factor in Protein Degradation

Funded by the ASPIRE Internal Grant Program

Proteins are essential to life. They perform a variety of functions within the cell, including cell regulation and DNA synthesis. Just as important as protein synthesis is the antiparallel process of protein degradation. A protein must be degraded when it is no longer necessary, is damaged, or behaves aberrantly to prevent organismal harm. Proteins can behave aberrantly by persistently engaging with a protein channel called the translocon, which allows proteins to move across the membrane of the endoplasmic reticulum. In humans, a protein known to clog the translocons is a component of low-density lipoproteins (or “bad cholesterol”). A ubiquitin ligase in yeast known as Hrd1 polyubiquitylates the aberrant protein, tagging it for degradation via the proteasome. The proteasome detects polyubiquitination and degrades tagged proteins, recycling them into shorter fragments. Ubiquitin ligases rarely function alone, and yeast lacking Hrd1 still exhibit residual degradation of translocon-clogging proteins, suggesting the existence of alternative degradation pathways. We performed a genome-wide screen to identify genes that may play a role in protein degradation of translocon-clogging proteins, identifying a potential 150 candidates. Further small-scale reporter assays were performed, confirming the role for 42 genes in protein degradation. Additional biochemical validation using cycloheximide chase showed the requirement of 3 genes, one of which is part of a heterodimeric transcription factor complex involved in lipid synthesis. With the process of protein degradation being conserved in both yeast and humans, validated genes may represent therapeutic targets for patients with elevated levels of cholesterol.

Faculty Mentor: Eric Rubenstein
College of Sciences and Humanities
*Sara Bailey, *Daniel Spencer, Jake Dibble & Dan Gonzalez

Computer Science
College of Sciences and Humanities

**Betterflye Content Management System**

The goal of this project is to manage content from users on the Betterflye platform. The features include profanity censoring amongst text, image filtering, and Admin tools. This ensures that our client can be confident that content on the website is clean and family-friendly. Creating an environment that is welcoming to all users is paramount to the Betterflye team, and our content management system enables the team to do so.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
The Role of Dehumanization on Sexist and Violent Attitudes

The dehumanization theory has recently come into question as it has various definitions between the three fields in which it is studied (e.g., social psychology, neuroscience, philosophy) (Over, 2020). Past research has shown that the dehumanization of another person can lead to increased willingness to cause harm on said person (Rudman & Mescher, 2012; Viki et al., 2013). The present study seeks to gain more clarity into the psychological side of the dehumanization theory through the combination of several previous studies with different methods of achieving dehumanization (Rudman & Mescher, 2012; Tipler & Ruscher, 2019; Viki et al., 2013). While many previous studies have focused on harm, this study will be exploring sexist attitudes and attitudes towards violence. Adults over the age of 18 recruited from Facebook and Reddit will take a survey containing a dehumanization manipulation as well as questionnaires measuring levels of sexism and attitudes towards violence. Only half of the participants will actually be manipulated for dehumanization in this study. A Qualtrics survey will employ a dehumanization vignette, the Ambivalent Sexism Inventory (Glick & Fiske, 1996), and the Revised Attitudes Towards Violence Scale (Anderson et al., 2006). The relationship between those who are manipulated for dehumanization and those who are not will be examined through an independent samples t-test in SPSS. The outcomes of this research will ideally help with some of the disconnect that is present within the dehumanization theory while also providing information about previously under-researched areas.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Sydney Oliver

Biology
College of Sciences and Humanities

Understanding how MitoNEET Contributes to Oxidative Stress

Funded by The National Science Foundation

MitoNEET is a outer mitochondrial membrane protein that contains a [2Fe-2S] cluster. Since its discovery, three genes of the protein family have been identified as CISD1 (mitoNEET), CISD2 (NAF-1), and CISD3 (Miner 2). If the metal cluster is lost from NEET proteins, it can cause oxidative stress because free iron causes the formation of reactive oxygen species (ROS) which can then go on to cause the formation of reactive sulfur species (RSS). These reactive species cause damage to proteins, lipids or DNA. MitoNEET and NAF-1 play unclear role(s) in resistance to oxidative stress and are possible drug targets for cancer cell, diabetes, and Parkinson’s Disease. In my project I have started to explore how 1.) mitoNEET contributes to sulfur-metabolism in human biochemistry and 2.) how NEET proteins interact with each other. This study is impactful because oxidative stress in cells is strongly influenced by the balance between ROS and RSS. I am completing this project to understand how the chemistry of mitoNEET impacts RSS and then extending this knowledge into yeast cells to examine the results in a cellular environment under oxidative stress. The primary research methodology of thin-layer chromatography showed that a new chemical is being made when the amino acid cysteine is combined with mitoNEET. This result indicates an enzymatic function of mitoNEET that would integrate into maintaining cellular redox balance. Additionally, yeast-2 hybrid experiments have shown interaction between NAF-1 with itself and NAF-1 with mitoNEET. Future studies will extend this work by examining how NAF-1 interactions in yeast cells are impacted by oxidative stress.

Faculty Mentor: Mary Konkle
College of Sciences and Humanities
**Taurice Hagemann**

English
College of Sciences and Humanities

**Consumption and Wealth Inequality in Bong Joon-Ho’s “Parasite”**

This project analyses the different presences and purposes of food throughout the film “Parasite”, and the ways in which this is symbolic of wealth inequality and class divide.

Faculty Mentor: Emily Rutter
College of Sciences and Humanities

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**Taylor Karns**

Biology
College of Sciences and Humanities

**The effects of DHX36 on the Initiation of Lymphoma.**

Funded by an External Grant

Cancer kills nearly 700 thousand people each year in the United States, making the discovery of novel therapeutic targets an urgent need. The c-MYC gene is a cancer-driving gene that is commonly found to be overabundant in tumors. Relevant to the research in our lab, the c-MYC gene promoter sequence is highly enriched with guanines (G’s). G-rich DNA or RNA sequences can form “knot-like” structures termed G-quadruplexes that act as regulatory checkpoints for transcription. For transcription to proceed, the G-quadruplex must be untied. The cell contains enzymes that unwind G-quadruplexes. The major enzyme responsible for untying G-quadruplexes is Dhx36. Dhx36 is overabundant in most cancers and increases c-MYC expression. For this study, I will determine if overexpression of Dhx36 initiates tumorigenesis and/or increases progression of established tumors. I hypothesize that Dhx36 overexpression will initiate tumorigenesis and accelerate tumor growth. I will test this hypothesis using novel transgenic mouse tumor models. c-MYC expression levels will be assessed using qRT-PCR and RNA sequencing technologies. I expect completion of this work will contribute to the basic understanding of cancer pathogenesis and begin to establish Dhx36 as a novel therapeutic target.

Faculty Mentor: Philip Smaldino
College of Sciences and Humanities
Travis Kelly

Psychological Science
College of Sciences and Humanities

The Emotional Toll of a Pandemic: A Linguistic Analysis of Twitter Posts Throughout COVID-19

Funded by the ASpiRE Internal Grant Program

Little research has currently been done focusing on how the COVID-19 pandemic has affected the mental and emotional processes of people in the United States. The few studies that have been published so far have focused on self-report measures to analyze the impact. While these publications are a good first step, more research needs to be done using methods controlling for the bias often found in self-report data. As very little research has been used with naturally occurring data, the present study focuses on this approach. This study will harvest tweets from Twitter, half relating to COVID-19 and half not relating to COVID-19 and will be analyzed to look at linguistic differences throughout the COVID-19 pandemic. The focus on the present study is to look at differences relating to emotional distress, suicidal ideation, uncertainty, and depression on Twitter throughout the COVID-19 pandemic.

Faculty Mentor: Thomas Holtgraves
College of Sciences and Humanities
Vincent Ramos-Naives

English
College of Sciences and Humanities

**Examining the Divide: The Parasitic Relationship Between Socioeconomic Groups as explored through film by Bong Joon-Ho’s "Parasite" and "Snowpiercer"**

Bong Joon-Ho’s portrayal of Class and the war between those who inhabit either end of the socioeconomic spectrum has long been noted and explored by critics and scholars for years. In particular, his films Parasite and Snowpiercer offer a dynamic exploration of this topic. Existing conversation about these films delves deeply into the symbolism for class and status, but rarely do they come from an emphasis in food studies and the way food can be used to denote socioeconomic structures. While that conversation is growing, I hope to expand it further by focusing on the space and method in which food is consumed in these films through a socioeconomic and gender lens. Parasite and Snowpiercer are essential to this conversation because of their careful use of space and consumption. There is a clear spatial divide between the lower and upper classes in these movies that is invaded by a group. With this spatial divide, we see food spaces change in order to reinforce a binary idea of how class structure exists. Along with the change in space, change in method of consumption is equally important to analyze. The subtle but powerful differences create an image that serves to emphasize socioeconomic position. For this reason, I seek to examine these aspects of food studies in order to further existing conversation.

Faculty Mentor: Emily Rutter
College of Sciences and Humanities
Admin Portal, Bringing utility to RefReps

RefReps, a startup company, currently has an application meant to train referees. Creating lessons for the referees can require a lot of technical knowledge. To aid the team at RefReps, our team was brought to add additional functionalities to allow for admins to expedite the process of uploading, organizing, and shipping these lessons.

The project start included a Unity project that had training videos and lessons hard coded in. Every time a new lesson or video needed to be added, it was a long process that required a developer. In working on this, we have implemented a React app, our “Admin Portal”, and a Firebase database to automate a majority of the process. The React app was created to store the relevant data for lesson packs in the database.

Within the original Unity project, changes have been made to connect the firebase to the application, allowing for lessons to be pulled and displayed without any hard coding. These lessons are now coming from the database itself. The application also creates the relevant connections for the lessons and properly displays their contents.

Future iterations of this project will be geared towards statistics gathering and analysis. Users should be able to locally see their own statistics, as well as those statistics being sent out for analysis.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Wyatt Lawrence, Josh Kennedy, Benjamin Furlani & Nick Hammerstrom

Computer Science
College of Sciences and Humanities

See Your AWS Services in One Place

In order for an AWS user to see their instances and statuses, they have to use the AWS console and navigate to different pages. With our application, the user can log in with their AWS credentials and see their instances and statuses visualized on one dashboard. Our application doesn't support all AWS services, but it does support the most commonly-used ones.

Faculty Mentor: Huseyin Ergin
College of Sciences and Humanities
Miller College of Business
Andrew Rattin, Cade Clinton, Alison Vielee & Austin Gustin

Information Systems and Operations Management
Miller College of Business

Indianapolis International Airport Pre-Security Analysis

Indianapolis International Airport Pre-Security Analysis.
Faculty Mentor: Fred Kitchens
Miller College of Business

*Jared Scheurich, *Phil Belpasso, Dakota Hand & Conner Somers

Information Systems and Operations Management
Miller College of Business

Navigating Through the Post-COVID Airport

Navigating Through the Post-COVID Airport.
Faculty Mentor: Fred Kitchens
Miller College of Business
The Future of Airport Security: How Covid-19 is Affecting the Indianapolis International Airport


Faculty Mentor: Fred Kitchens
Miller College of Business

Safe Arrivals in a Post-COVID-19 Environment

Safe Arrivals in a Post-COVID-19 Environment

Faculty Mentor: Fred Kitchens
Miller College of Business
Lauren Warman, Kevin Mattingly, Cully Upperman & Josh Petro
Information Systems and Operations Management
Miller College of Business

Improving the Pre-Airport Experience During COVID-19

Improving the Pre-Airport Experience During COVID-19.

Faculty Mentor: Fred Kitchens
Miller College of Business

*Mariah Bowman
Economics
Miller College of Business

Eliminating Mental Health Stigma on Ball State’s Campus

Eliminating Mental Health Stigma on Ball State’s Campus.

Faculty Mentor: Gerry Waite
College of Sciences and Humanities
R. Wayne Estopinal College of Architecture and Planning
Understanding Contemporary Urban Spaces: Techniques for Mapping People’s Spaces

Land-use is the most popular mapping technique used by urban planners. The four or five highly generalized large-scale land-uses they use are unable to capture most urban activities important to ordinary people. Jane Jacobs (1961) calls those the secondary and tertiary “land-uses” that fall through the cracks. Hence, the question: What are more substantive alternatives to land-use mapping? While People’s Spaces (Perera 2016) argue for the need for understanding how people create spaces for their daily activities and cultural practices, critical cartographers have been exercising different mapping techniques to understand and explore people’s spaces. Nancy Peluso’s (1995) counter mapping and Denis Wood’s (2010) deep mapping techniques not only challenge traditional land-use mapping but also highlight people’s rights and agency. This study juxtaposes these social and physical discourses, apply these mapping techniques on spatial stories highlighted in Perera (2016) and ask how these techniques could be adapted for planning and development. The study and outcomes will help planners to practice inclusive planning and development.

Faculty Mentor: Nihal Perera
R. Wayne Estopinal College of Architecture and Planning
The current prison system in America was put in place in 1891 under the Three Prisons Act. Jail and prison designs have historically been meant to keep those on the inside in and those on the outside out. Jails have many design flaws that are detrimental to a prisoner’s health. They tend to be overcrowded, offer poor healthcare, lack privacy, and deprive people from stimulation which can exacerbate mental health problems. According to The Star Press, the Delaware County Justice Center in downtown Muncie experienced overcrowding. The facility had a maximum capacity of 220 inmates, but frequently housed over 300 inmates. A new jail in the former Wilson Middle School is expected to house 500-750 inmates. This stopgap solution to overcrowding solves some of the community problems of incarceration but does not go far enough to address other areas of incarceration in America. A solution to the current American prison design is what people are calling “humane prisons.” This design philosophy believes that American prisons could build more respect for their inmates by incorporating design elements that mimic daily life.

This presentation incorporates design ideas for the “new” jail facility of Delaware County with depictions of what sorts of features might make it more humane. Since it is already in use visits to the site may not be possible however, artist’s sketches can show features that may be possible and benefit the larger community through a change in incarceration philosophy as opposed to the current utilitarian approach.

Faculty Mentor: Gerald Waite
College of Sciences and Humanities
Dinushi Samarasekara

Urban Planning
R. Wayne Estopinal College of Architecture and Planning

The Production of Vishuddhi Spaces and their Subjects: Identity, Meaning, and Space of the Ritigala Vishuddhi Haramba Process and the Establishment, Based in Ritigala, Sri Lanka

Space is socially produced: Every social practice creates space and space affects practices (Lefebvre 1991). Specific communities in specific cultures give different meanings to their space.

This study is based on the people whom I refer to as the Ritigala Vishuddhi community, the bearers of an indigenous combat art known as the Ritigala Vishuddhi Haramba, which originated two millenniums ago, in Ritigala, Sri Lanka. Despite the ancient lineage of attending to national security, today, the Ritigala Vishuddhi Haramba is carried out in a new meaning and an identity in the contemporary context. The Vishuddhi education is dispersed across the country through a network of 166 spaces, built by an ancient king following a powerful constellation at the time, making Ritigala their command center.

They are a unique community with a unique practice, culture and an identity, and are the creators of their unique space.

The study brings about the worldviews, perceptions, and aspirations of this community, expressing who they are, what they do, their knowledge, what spaces they make, through what practices, and why these spaces are important to them, in order to analyze how they produce spaces through the Vishuddhi process creating their identity and sense of place. The application of the inside-out approach and participant-observation in the field assisted me in understanding research subjects from their vantage point. The key methodology, collaborative ethnography provided me with an intellectual platform to work together with my research subjects in the field and the writing process as well.

Faculty Mentor: Nihal Perera
R. Wayne Estopinal College of Architecture and Planning
Elise McQueen

Construction Management and Interior Design

R. Wayne Estopinal College of Architecture and Planning

Escape Space

Escape Space is located in downtown Indianapolis and will serve as a gathering and place to escape from home, work, noise, people, or anything else you may need a break from. Escape Space is a new type of space inspired by the quarantine experience, during which we were stuck in one location, experienced social isolation and loneliness, and there were increased cases of mental health struggles, specifically depression and anxiety. The space will focus on creating an interactive, community-focused experience that meets the physical and emotional needs of every visitor. The first floor features a cafe and gathering space with Covid-19 safety integrated into the interior design to keep visitors safe and comfortable in the public setting. The second floor includes many "escape spaces" which range from rooms for art therapy, chromotherapy, and themed rooms for individuals or small groups. Themes can include travel destinations, time periods, events, or any other creative environment that can be thought up. Unique audio, lighting, materials, and furniture choices will create a full sensory experience in each room. These "escape spaces" allow people to briefly escape the monotony or craziness of daily life in a safe and affordable way. Escape Space will strive to meet the community's social and emotional needs by providing spaces for gathering and socialization, as well as individual spaces for quiet meditation or creative expression.

Faculty Mentor: Sarah Alfaro

R. Wayne Estopinal College of Architecture and Planning
Kelsey Park

Architecture
R. Wayne Estopinal College of Architecture and Planning

Aurora Boutique Hotel

The Aurora Hotel is located in San Antonio, Texas. This hotel is being designed to create a space that is equally as captivating as the community in which it is placed. Boutique hotels are designed to cater towards guests in a more personal fashion than conventional hotels. The Aurora Hotel will exhibit guest-oriented services, theatrical experiences and design, as well as providing guests with ultimate safety in times similar to our current pandemic. This hotel is designed with a concentration on how to adapt to COVID seamlessly in the design of the space. Designing around COVID standards will create a space people feel safe enough to travel to and spend time in. Infusing dynamic and flexible designs are key to create a hotel that provides a safe and beautiful experience for anybody to enjoy.

Faculty Mentor: Sarah Alfaro
R. Wayne Estopinal College of Architecture and Planning
Daniel Bullman
Special Education
Teachers College

The Impact of Trauma on Formerly Incarcerated Persons' Use of Webs of Support

According to the FBI, an estimated 73.5 million people in the USA have a felony arrest records. Conflict with the justice system and the presence of a criminal history creates barriers for individuals seeking higher education, employment, housing, known as collateral consequences. Despite trauma and obstacles, a segment of the affected population has shown a significant positive progress and individual prosperity post conviction or incarceration. Evidence indicates that webs of support can benefit outcomes of individuals as well as organizations. However, little is known about whether this particular population has access to or utilized support networks in achieving their goals. This paper reports the results of qualitative interviews with 4 adults with varying levels of conflict with the criminal justice system and compares findings with current work exploring the impact of trauma on individually perceived success.

Faculty Mentor: Jane Ellery
College of Health
The Importance of Daylight in Classrooms and Its Influence on Students

Not everyone detests classrooms without windows. However, it is important to realize that significant changes and improvements have been made to the daylight. Benefits of classrooms without windows reported in previous studies include that occupants can use more space for bulletin boards and bookcases, more artificial lighting levels, less noise, lower maintenance costs, and freedom from students’ distractions. However, there are many examples in many previous studies that students have better learning skills in classrooms with daylight.

Daylight is a very necessary element for students to achieve their academic abilities, and it is an important factor to students to receive natural light when designing an educational space. Previous studies emphasize light, temperature, air quality and color affect classroom space. While various factors affect students’ academic performance, the impact on learning progress in an environment which has the quality of daylight is significant.

The effects of daylight on the classroom are various. One of them is the study of attendance or absenteeism. A number of studies has been conducted to analyze the relationship between students’ attendance rates in classrooms with sufficient daylight and those with insufficient daylight. Schools incorporating natural light show higher student and teacher attendance than schools depend on artificial lighting.
Virtual and Augmented Reality: Applications to the Field of Adult Education in a Post-Covid-19 Era

As our society becomes more globalized and interconnected, technology adoption has become an essential factor for adult education. As a result of the social distancing guidelines imposed by the COVID-19 pandemic, education has been forced to adopt technology for learning purposes rapidly. Consequently, the advancement in technology has made it possible to adapt different improvements to the learning and teaching activities. Technology in education can improve students’ engagement, enhance participation, improve critical thinking and problem-solving, have immediate feedback, perform hands-on learning, and develop new skills to fulfill the adult’s specific educational needs. Consequently, the use of technology for adult education might imply using some new applications such as virtual reality (VR) and augmented reality (AR). Virtual reality technologies allow users to fully immerse and interact with virtual environments and objects, providing sensorial feedback. Augmented reality allows the interaction with the surrounding environment by superimposing images to real scenarios. Both technologies can be used as an enabler element to foster Self-Directed Learning (SDL), opening the opportunities for a learner’s richer experience. Consequently, to support adult learning, institutions and practitioners can use VR and AR technologies to adapt their practices to adult learning effectively. This poster presents the VR and AR technologies and relates them to the potential use of education for adults.

Faculty Mentor: Dr. Regina Giraldo-Garcia
Teachers College
The Keys/Litten/Smith Awards were established in memory of Linda Keys, Jeffrey Litten, and Sandra Smith, who all served in research administration at Ball State for a combined total of thirty years. The awards recognize students for their outstanding research or creative endeavors presented during the poster session at the Student Symposium. Anyone wishing to contribute to the Keys/Litten/Smith Student Symposium Awards fund may do so by sending a check made payable to Ball State University Foundation, notating either Account #9652 or Keys/Litten/Smith Symposium Award in the lower left hand corner. Checks may be sent to the Ball State University Foundation or Sponsored Projects Administration.
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TO ALL OF OUR 2021 STUDENT SYMPOSIUM PARTICIPANTS.

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Watch for registration materials in January 2022

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