

**Program and Abstracts**  
**Celebration of Student Scholarship**



**Showcase of Student Research, Scholarship,  
Creative Work, and Performance Arts**

**April 27, 2022**

# Celebration of Student Scholarship

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## Program Overview

7:45- 9:00 a.m.	Registration for all Student Scholars and mentors – 3 <sup>rd</sup> Floor Go to your presentation room – load your PowerPoint presentations Set up posters in ADUC Ballrooms B & C
10:00 – Noon	Oral presentations with a 15-minute break (optional) at 11:00 a.m.
1:30 – 3:00 p.m.	Poster Presentations ADUC Ballrooms B & C
4:00 p.m.	Gallaher Memorial Music Performance, ADUC Theater Molly McBride Award, Experiential Education Awards, and Student Presentation Awards / Gifts to presenters
5:00 p.m.	Poster removal

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## Special Thank You to the Following:

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*Katy Carlson*                      *Greg Corso*                      *Joy Gritton*  
*Shannon Harr*                      *Kouroush Jenab*                  *Lesia Lennex*

### Concurrent Session Moderators

*Michael Dobranski*                  *Constance Hardesty*                  *Sylvia Henneberg*  
*Eric Jerde*                      *Philip Krummrich*                  *Wayne Miller*

### Judges

*Max Ammons*              *Courtney Andrews*              *Michelle Barber*              *Rachel Barber*  
*Christopher Beckham*      *Mark Blankenbuehler*              *Megan Boone*              *Stephen Brigham*  
*Katy Carlson*              *Steve Chen*              *Jennifer Grace Clark*              *Greg Corso*  
*Laurie Couch*              *Constance Hardesty*              *Shari Kidwell*              *ZacharyLee*  
*Melissa Mefford*              *Doug Mock*              *Lydia Njoroge*              *Michele Paise*  
*Manuel Probst*              *John Rose*              *Jonie Shepherd*              *Elizabeth Thomas*  
*Lisa Ann Wallace*

# Welcoming Statements

## **Dr. Jay Morgan, President:**

Our vision is for Morehead State University to be universally recognized for teaching and scholarship of the highest quality resulting in superior student success. To ensure the optimal environment for learning, Morehead State University has a long tradition of combining great teaching with success in scholarship and creative productions. Our academic programs provide a wealth of opportunities for students to work alongside experienced faculty in meaningful research and creative initiatives that stretch our students' intellectual horizons.



The faculty member who mentors students in research and other creative activities provides the stimulus that challenges imaginative minds often in new and innovative ways that would be impossible with the confines of the conventional classroom. Our deep commitment to a culture of undergraduate research results in a rich educational experience for our students and empowers our diverse population of scholars to reach their educational goals.

The Annual Celebration provides a welcome opportunity for everyone to see the products of these unique intellectual partnerships – products that are remarkable in their originality, scope, and depth. As you review the Celebration of Student Scholarship program, you will discover a wide range of student accomplishments in individual and group research projects, creative efforts, and artistic performances across all academic disciplines.

When considering the accomplishments on display at this year's Celebration, I am confident that through the continued efforts of all those involved, our University will establish itself as a primary destination for students who wish to become both active partners in the process of discovery and exceptional citizens of our increasingly challenging world.

Now in its fourteenth year, our Annual Celebration of Student Scholarship is a time when we can all pause to reflect on the outstanding efforts of this community of scholars and to recognize the tremendous efforts of our students in research, scholarship, and creative productions.

I encourage you to attend this showcase and provide your support and encouragement to our young scholars and artists, as well as to the members of our faculty and staff who have shared of their time and talent to help their students bring these projects to reality. Thank you for your participation!

## **Dr. Tony Norman, Provost and Vice President for Academic Affairs:**

Welcome to the Spring 2022 Celebration of Student Scholarship event. This is my first Celebration to attend, and I look forward to walking the building and seeing the variety of scholarly and creative works of our students and their faculty mentors. Although as a university we are committed to quality instruction to provide the foundational knowledge students need to succeed in their chosen field, student participation in research and creative production activities provides the opportunity for students to transition from knowledge consumers to knowledge producers and artistic creators.



As such, this annual Celebration event exemplifies the ideal learning environment Morehead State University strives to create in which scholarship, teaching, and service come together. My many thanks to faculty mentors who have dedicated their time and talents to guide our students' intellectual and creative development. I know you are proud of their accomplishments, but I encourage you to share in that pride because of the support structures you provided to ensure their success. I close with a heartfelt "congratulations" to all of our student scholars for your accomplishments. May these represent the first of many steps on your journey to become the intellectual leaders of the next generation.

**Dr. Scott Davison, Dean, Caudill College of Arts, Humanities, and Social Sciences**



The Celebration of Student Scholarship provides a vivid sample of the excellence of our students across the entire university. Every year, these students demonstrate the capacity to excel in their fields in ways that go beyond ordinary work in the classroom. We join with the university community in recognizing these exceptional students and their achievements on this special day.

**Dr. April D. Miller, Dean, Volgenau College of Education**

The Celebration of Student Scholarship is a unique opportunity to showcase research conducted by students with faculty mentors. The Volgenau College of Education students work with faculty in one-to-one research projects which enhance their practice in the schools and their understanding of inquiry in the real world. These projects extend beyond coursework to elevate student learning at both the university and school levels. Congratulations to each of our presenters!



**Dr. Johnathan Nelson, Dean, Smith College of Business and Technology**



Undergraduate research provides an opportunity for our students to apply and enhance upon the knowledge and critical thinking skills they are gaining in their coursework. It also helps students develop their communication skills as they prepare to present their research discoveries. The Celebration of Student Scholarship allows us to celebrate the efforts of faculty and students involved in undergraduate research and to showcase the excellent and creative work accomplished through these collaborations.

**Dr. Wayne C. Miller, Dean, College of Science**

The Celebration of Student Scholarship provides a wonderful opportunity to recognize and celebrate student scholarship and creative accomplishments. The relationship among faculty mentors and student scholars is enhanced when they work together to discover and disseminate new knowledge or express themselves through various forms of creativity. Student research and creative activity is an essential component of undergraduate education. Students working with faculty in scholarly activities not only experience the excitement of discovering new knowledge and solving challenging problems, but also learn important life skills that are necessary to thrive today's ever-changing world.



### **A. FRANK AND BETHEL C. GALLAHER MEMORIAL MUSIC PERFORMANCE COMPETITION**

Established as a memorial in 2004 to A. Frank and Bethel C. Gallaher, who believed strongly in the value of education and competition, the competition proposes to challenge music students to excel in performance artistry. This competition is open to full-time (minimum of 12 semester hours) undergraduates enrolled in the Department of Music, Theatre and Dance who meet the criteria established by the endowment. There is a semi-final competition (adjudicated) held no less than four weeks prior to the final competition, if it is deemed necessary, to select an appropriate number of candidates for the final competition which is also adjudicated and takes place on the second Friday in April. The winning performer receives a cash prize and agrees to performing the same repertory from memory at the annual Honors Convocation.

#### **2021-2022 Gallaher Competition Winner**

**Taylor Pfaff**, a junior Music Education student at Morehead State University, is currently a member of the Symphonic Winds, Concert Choir, Percussion Ensemble, Steel Band, and Marching Band, earning the distinction of being the first female snare line member in the award-winning MSU Drum Line. She is also the President of the Morehead State Percussion Club and Secretary of the state chapter National Association for Music Education. Additionally, Taylor serves as a sound technician for Baird Music Hall and a Resident Advisor in housing. Following graduation, Taylor plans to begin her teaching career as an elementary music teacher and later pursue a Master's degree in music. Taylor's hometown is Hilliard, Ohio.

**Experiential Education Awards presented by  
The Center for Career Development and Experiential Education**

**2021 Student Intern of the Year**

The Morehead State University 2021 Student Intern of the Year Award is granted to **Catrina Craig**, a Business Administration major in the School of Business Administration, part of the Elmer R. Smith College of Business and Technology for her internship in Human Resources at Lion. Lion is a company that offers products and services designed to ensure the health, safety and performance of First Responders and military personnel. Catrina helped coordinate the recruitment and training efforts for Lion's expansion of operations in Kentucky. Catrina's supervisor touted that the "quality and amount of work that she does each week has truly surpassed our expectations for an intern." Furthermore, she displayed "a positive attitude professional appearance and was flexible to accommodate last minute modifications to a project." According to her supervisor, Catrina's professionalism and initiative "impressed not only the Human Resources team but other site leadership members as well." Catrina's involvement in this internship allowed Lion to equip more First Responders across the world during this unprecedented time in history.

**2021 Faculty Supervisor of the Year**

The Morehead State University 2021 Faculty Supervisor of the Year award is granted to **Professor Marshall Jenkins** for his outstanding support of students completing their internships as part of their radiological science education. Even before students begin their internships, he provides invaluable support. According to one of Professor Jenkins' students, "he made sure that we were comfortable with the content and explained it on a real-world basis. It was an easy transition into the work environment because each class and lab time was set up like a situation, I would see in the radiology department." Professor Jenkins shows his commitment for the students by being available to the students throughout the day if they have any questions or need help while at their internship site. This student elaborated, "He is always eager to hear our successes and it makes us feel cared for as students." Professor Jenkins' positive relationships with the clinical internship sites, his accessibility to students throughout their internship experience, and his focus on students having the knowledge and confidence to be successful in their internships ensures that students get the most out of this high impact practice.

**2021 Employer of the Year**

The Morehead State University 2021 Employer of the Year Award is granted to MSU's **Camden Carroll Library's Special Collections and Archives**. Special Collections is responsible for acquiring and providing access to information about the cultural history of the Appalachian region of northeastern Kentucky and the Archives serves as the institutional memory of the university. This award recognizes Dieter Ullrich, the head of Camden Carroll Library's Special Collections and Archives for his impact on MSU's student internships. In the Spring of 2021, Mr. Ullrich worked closely with Jacob Matthew Bush, a Public History Major, on a project involving oral history interviews commemorating student and staff Covid-19 experiences. Jacob shared that Mr. Ullrich taught him not only about organizational processes, digitizing documents, and archival information but also was "attentive to his progress and when he reached a bump in the road or a dead end, he always had a recommendation for him". Jacob's internship with this invaluable employer partner allowed him to gain hands-on experience developing career skills like critical thinking and communication that will allow him many academic and professional opportunities in the future.

## Molly McBride Tutoring Excellence Award

The Molly C. McBride Memorial Scholarship Endowment was created in 2013 to honor the life of former MSU student, Molly McBride. McBride's life ended prematurely at the age of 21 on May 18, 2013, after being involved in an automobile accident. At the time of her passing, she was a junior biomedical science major at Morehead State University and was planning for a career as a physician's assistant. Molly was a dedicated student who enjoyed helping others, especially through her work as a tutor in MSU's Tutoring and Learning Center. Each year the Molly C. McBride Tutoring Excellence Award is given to a tutor who demonstrates superior tutoring skills and caring for MSU students.

The recipient of the 2022 Molly C. McBride Tutoring Excellence Award is **Mercy Hailu**. Mercy is a junior, biomedical science major from Addis Ababa, Ethiopia. Mercy began tutoring biology and chemistry courses for the Tutoring and Learning Center in the Fall of 2021. While serving as a tutor she has led study groups for BIOL 234 and BIOL 244. Mercy plans to attend medical school after graduation. Mercy also serves as an orientation leader for MSU.

# Concurrent Oral Presentations

## Session 1

### ADUC 301

#### Moderator: Dr. Eric Jerde

**10:00 - 10:15 a.m.**      **Long Term Monitoring Campaigns Of Active Galactic Nuclei (Agn)**

OP-01

***Salem Wolsing\****, ***Dr. Dirk Grupe, mentor***, Department of Physics, Earth Science and Space Systems Engineering, College of Science

I will present results for long-term monitoring campaigns of Active Galactic Nuclei (AGN) using the NASA Swift mission. AGN are supermassive black holes at the center of galaxies that grow by accreting matter. AGN are variable in flux on different time scales. My job is to find AGN that become dim or those that are flaring. Finding AGN in extreme states allows us to trigger other X-ray observatories like XMM and NuSTAR. This enables us to study the inner part of the AGN in order to better understand the condition in the vicinity of the central black hole.

**10:15 - 10:30 a.m.**      **Grain Size And Petrographic Analysis Of Suspected Loess In Rowan County, Ky**

OP-02

***Nathaniel Sparks\****, ***Ms. Antonia Bottoms\*\****, ***Mr. Charlie Mason\*\****, ***Dr. Jen O'Keefe, mentors***, Department of Physics, Earth Science and Space Systems Engineering, College of Science, Kentucky Geological Survey\*\*, University of Kentucky

A series of upper-level sedimentary deposits in Northern Rowan County Kentucky, mapped as weathered Nancy Member colluvium, do not have visual characteristics typical of weathered clay-rich siltstone, prompting speculation that they may be loess deposits. The deposits are uniformly light-yellow color and are primarily angular quartz silt, rather than rounded quartz silt, and contain minor amounts of feldspar, mica, and clay. The deposits overlie more typical colluvium and thicken to the northeast. Here we present grain-size, sedimentary petrographic, and elemental compositional analyses of samples from the anomalous exposures and compare them to samples from typical Nancy Member and Farmers Member-sourced colluvium as well as the mapped loess deposit in Vanceburg, KY. Grain-size analysis alone is insufficient for differentiating loess from colluvium in this region, however the combination of grain-size analysis, rounding, and petrography reveals differences between the deposits. Rounding is especially important for differentiating loess from colluvium; both Nancy Member and Farmers Member colluvium contain rounded sediments, while those from all other exposures are angular. Results of this study will be used to edit the surficial geology map of Rowan County.

**10:30 - 10:45 a.m. Fungi In A Warmer World: Implications Of Fungi From The Bouie River Fossil Flora Site, Upper Hattiesburg Formation, Mississippi**

OP-03

***Tyler Spears\**, *Dr. Ingrid Romero\*\**, *Dr. Jennifer O'Keefe*, *Dr. Matthew Pound\*\**, *Dr. Noelia Nuñez Otaño\*\**, *Dr. Sophie Warny\*\**, *mentors*, Department of Physics, Earth Science and Space Systems Engineering, College of Science, Facultad de Ciencia y Tecnología, Laboratorio de Geología de Llanuras\*\*, Universidad Autónoma de Entre Ríos / CICYTTP (CONICET-UADER-Prov.ER), Department of Geology & Geophysics\*\*, College of Science, Department of Geography and Environmental Sciences\*\*, Northumbria University**

Fungal spores are potential proxies for local paleoenvironmental conditions, however they are understudied in the fossil record. Unlike pollen, they are dispersed in immediate proximity to the parent fungal body, which gives a local record, rather than mixed signal of combined local and regional conditions. Very few studies have examined Middle Miocene fossil fungal diversity in the Gulf Coastal Plain (USA) and none have examined their usefulness for tracking climate change. The Fungi in a Warmer World project is defining climate-change related fungal assemblage shifts across the Miocene Climate Optimum (MCO) and into the Middle Miocene Climatic Transition (MMCT). The Middle Miocene fossil flora site (MS. 18.001), in the upper Hattiesburg Formation, contains a diverse macro- and micro-fossil flora that is indicative of sub-tropical paleoclimates during the MMCT, and it is very similar to biomes along coastal rivers in this region today. This study was designed to document the preserved fungal biodiversity in the upper Hattiesburg Formation and assess changes in fungal biodiversity during MMCT cooling. Preliminary results suggest that the diversity of fungal assemblages in the Upper Hattiesburg Formation decrease up section, which suggests that fungal assemblage diversity decreases with cooling temperatures. These findings provide new insights in an important window into fungal community dynamics during the Serravallian to early Tortonian (Middle Miocene) in the Gulf Coastal Plain.

**10:45 - 11:00 a.m. An Analysis Of A Chandra Observation Of The Galactic Supernova Remnant Kes 27 (G327.4+0.4)**

OP-04

***Tim Wright\**, *Dr. Thomas Pannuti*, *mentor*, Department of Physics, Earth Science and Space Systems Engineering, College of Science**

We present an analysis of an archival pointed observation made of the Galactic supernova remnant (SNR) Kes 27(G327.4+0.4). X-ray observations of SNRs reveal crucial properties of the X-ray emitting plasmas associated with these sources, such as the particle number density of the X-ray emitting plasma and its elemental abundances. The unsurpassed angular resolution of Chandra is essential for performing a spatially resolved spectroscopic analysis of Kes 27. We have extracted and analyzed spectra from concentric regions centered on the central peak emission of the X-ray-emitting plasma and searched for radial variations in the spectral properties (such as temperature, ionization time) particularly in our search for radial variations in the spectral properties of the X-ray emitting plasma. We present the initial results of our work.

**11:00 – 11:15 a.m. Break**

**11:15 - 11:30 a.m. Investigation Of Efficacy And Safety Of Intra Articular Treatment For Osteoarthritis In Horses**

OP-05

***Kaitlyn Cox\**. Dr. Katelyn Kaufman, mentor, Department of Agricultural Sciences, College of Science**

Osteoarthritis (OA) is a degenerative disease in which inflammation of a joint and subsequent deterioration of cartilage causes chronic lameness in horses. While there is no cure for OA, treatments aim to mitigate the swelling, inflammation, and pain associated with this disease.

The objective of this study was to investigate the effectiveness and field safety of an intra-articular treatment given one, two, or three times at 7-day intervals to improve lameness associated with OA in horses. The results of this study were submitted to the Food and Drug Administration (FDA) for required evidence of safety and efficacy of a New Animal Drug Application.

Horses were randomly assigned to a double-blind placebo-controlled trial with a 1:2 ratio of placebo (CON) to study drug (TRT) via intra-articular injection. Horses were admitted to the study if they had a lameness score  $\geq 2$  at screening using the American Association of Equine Practitioners (AAEP) lameness grading scale. Additional selection criteria included diagnosis of OA following a veterinary physical exam and radiographic evidence in a single appendicular joint. Horses were treated up to 3 times (day 0, 7, and 14) based on lameness evaluation. Horses were stalled and hand walked for 2 days following treatment.

Effectiveness was measured by improvement in the AAEP lameness scores on day 28 compared with the baseline evaluation on day 0 which demonstrates the success of the treatment to control clinic symptoms of OA in horses. Results from this trial are pending release of the data by the FDA.

IACUC protocol #: 19-11-02

**11:30 - 11:45 a.m. Synthesis Of Asymmetric Hydroxyfulvenes**

OP-06

***Alina-Sophie Koch\**. Dr. Mark Blankenbuehler, mentor, Department of Biology and Chemistry, College of Science**

The synthesis of a variety of asymmetric hydroxyfulvenes was attempted using lithium cyclopentadienide and an acyl halide. The reactions, performed at low temperatures, yielded a mixture of symmetric and asymmetric hydroxyfulvenes. The mixtures were purified via column chromatography using silica and a 90/10 mixture of hexane and ethyl acetate. The recovered compounds were analyzed using Proton Nuclear Magnetic Resonance (HNMR) and thin-layer chromatography (TLC).

11:45 - 12:00 p.m.

**Harvester Ants And Their Ecological Roles In Deserts**

OP-07

***Abigail Fagan\**. Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science**

Harvester ants collect seeds as a food source and are important to seed dispersal in desert communities. This project was designed as an introduction to this group of ants, including identifying species collected, associated external mound structure type, and preparing an overview of their ecological role. Harvester ants include three genera: Pogonomyemex of 22 species that are widely distributed across the western United States, Veromessor of 9 species restricted to southeastern California, and Novomessor which are more uncommon of only 3 species found in Texas, Arizona, and New Mexico. The ants we are identifying were collected in desert areas of Texas, New Mexico, Arizona, Nevada, and California. We have collected 1 species of Veromessor, 1 species of Novomessor, and at least 6 species of Pogonomyemex. Differences in external nest architecture amongst species varied. Each species differs in their behavior as some are more aggressive, and others are more passive, which will affect the biodiversity of animals. Harvester ants influence their respective environments by increasing biodiversity in plants as they distribute seeds as their main food source.

# Concurrent Oral Presentations

## Session 2

### ADUC 310

#### Moderator: Dr. Constance Hardesty

10:00 - 10:15 a.m. Parental Depression And Behavior In A Dyadic Task

OP-08

*Brittany Stidham\**, *Tyra Baier*, *Griffin Newell*, *Rhys Rickerson*. *Dr. Shari Kidwell*, *mentor*, Department of Psychology, College of Science

Depressed parents have been shown to have children with increased emotional and behavioral difficulties (Hagal & Paley, 2020). Parenting is suspected as a primary reason for these findings. Depressed parents have demonstrated decreased availability and sensitivity, as well as increased irritability. However, the vast majority of depression and parenting research involves young children. We examined parental sensitivity and covert hostility in a 10-minute dyadic reminiscing task. Parenting behaviors towards their adolescent (average age 16.6 years) were noted every 15 seconds. Specifically, sensitivity was noted as present if a parent behaved in a manner that their child seemed to see as positive, whereas covert hostility was noted if a parent behaved in a mocking or dismissive manner. Parental depression was assessed separately using the Center for Epidemiological Studies Depression Scale (CES-D, Radloff, 1977). Analyses are forthcoming, but we hypothesize that higher depression symptoms amongst parents will be associated with lower rates of sensitivity and higher rates of hostility. If true, this will have important implications for their relationships with their teens, as well as their teens' adjustment. This research was funded by MSU's RCPC & URF programs, as well as KY NSF. IRB Protocol 15-09-11.

**10:15 - 10:30 a.m.      Is Parental Hostility Associated With Child Internalizing Symptoms?**

OP-09

***Griffin Newell\**, *Abigail Yates*. *Dr. Shari Kidwell*, *mentor*, Department of Psychology, College of Science**

Research suggests that caregivers' sensitivity is an important predictor of overall child well-being; however, sensitivity has much less often been examined in association with emotion regulation. In our study, we examined parental sensitivity and covert hostility during a dyadic reminiscing task in relation to children's capacities to regulate their emotions during an interview. As part of a larger, longitudinal study, 35 caregivers recalled recent positive and negative instances of behavior with their children (average age 6 years) over a ten-minute period. Sensitivity and covert hostility were assessed as present or absent in 15 second intervals. Sensitive behavior is noted when the parent responds in a way the child perceives as positive, whereas covertly hostile behavior indicates impatience and dismissing behavior towards the child. A separate interview was completed with the children, wherein they were asked to describe their experiences with six emotions. Emotion regulation was rated with a series of 4-point scales, including externalizing (e.g., hyperactive) and internalizing (e.g., sad) behaviors. Analyses are currently underway. However, based on previous findings, we hypothesize that parents with higher levels of covert hostility will tend to have children who display greater internalizing symptoms in the emotions interview. This research was funded by MSU's RCPC & URF programs, as well as KY NSF. IRB Protocol 04-09-12R1.

**10:30 - 10:45 a.m.      The Effectiveness Of Intervention Programs On Educational Outcomes Of Children Growing Up In Poverty**

OP-10

***Kaelyn Moore\**. *Dr. Timothy Hare*, *mentor*, Craft Academy for Excellence in Science and Mathematics**

This research project examines the effectiveness of intervention programs on educational outcomes of children growing up in poverty in Kentucky. Poverty is an issue with many different layers and dimensions, meaning it has impacts on almost every aspect of a person living a life in poverty, including their access to necessities, healthcare, employment, transportation, and safety. Consequently, poverty also affects a child's educational attainment and achievement. Inadequate educational attainment and achievement at a young age has impacts throughout an individual's life through such realms as financial literacy, employment opportunities, and access to higher education. One of the major ways to combat the effects of poverty on educational performance is implementing intervention programs designed to minimize the repercussions of living in poverty. I examined data collected through program webpages, evaluation reports, and phone surveys of eleven different intervention programs, like the Maternal, Infant, and Early Childhood Home Visiting and branches of Kentucky Strengthening Families. The factors analyzed included their focuses, the ages they target, their goals, how many families are involved, how they improve student performance, and how much they cost. This allowed for the determination of the most cost-effective intervention methods and programs. After the analyses were completed, it was determined that there was a lack of programs explicitly targeting poverty and its effects and programs seemed to focus on poverty's impacts only implicitly.

**10:45 - 11:00 a.m. Center Of Mental Health Progress (Compas)**

OP-11

***Charissa Reid\*, Emma Brock\*, Allison Scarlett\*, Fredre'Oni Terrado\*, Jane Zhang\*. Dr. Rachel Rogers, mentor, Craft Academy for Excellence in Science and Mathematics***

Entrepreneurial Coal Lands Redevelopment Program (ECLRP) is a competition based program in which high school teams of 1-5 students repurpose abandoned coal mines. Students in this program research the land, make business plans, and create models of the project.

This year's project of an adolescent mental health facility will be built on the unutilized land of Mine 23, a property belonging to the McCoy Elkhorn Complex. This mental health facility will be known as COMPAS (Center of Mental-Health Progress for Adolescent Success). Currently, 20% of adolescents suffer from mental illness (Mental Health, 2022). Mental illness is a prevalent issue teens are struggling with today. For the betterment of Kentucky teens and eastern Kentucky as well, COMPAS will be a treatment center for students who have experienced trauma, mental illness, and substance abuse. Many of the students COMPAS will provide services to will be from the Pike County school system, as that is where advertisement will mostly be generated from to start. Students will be selected through a selection process that will determine their needs and whether COMPAS is suitable for them.

To nurture the students' mental health needs. The center will provide a myriad of therapies, including art, music, equine, family, wilderness, and gardening therapy, in addition to workshops. COMPAS will also be servicing all of Pike County through the full-time boarding of local horses and selling excess crops grown in the garden.

**11:00 – 11:15 a.m. Break**

**11:15 - 11:30 a.m. Collective Participant In Professional Development During The Pandemic**

OP-12

***Victoria Kinney\*. Dr. Rebecca Roach, mentor, Department of Early Childhood, Elementary and Special Education, Volgenau College of Education***

Prior to the 2020 COVID pandemic, literacy professional development summer institutes led by the Collaborative Center for Literacy Development (CCLD) were always conducted in person. During the 2020 Covid pandemic, in compliance with health guidelines, most summer institutes were delivered through online synchronous platforms. Post-institute survey comments suggest teachers experienced collective participation even though they were not meeting in person. Through analysis of post-institute surveys and interview transcripts with program directors, this study examines how workshops created synchronous and asynchronous conditions to foster collective participation.

**11:30 - 11:45 a.m. Teaching Low Socioeconomic Rural Appalachian Kids: Are They Different Than Other Students?**

OP-13

***Reagan Massie\*, Grace Twyford\*, Madison Woosley\*. Dr. Jeannie Justice, mentor, Department of Foundational and Graduate Studies in Education, Volgenau College of Education***

Is teaching low-socioeconomic rural Appalachian students different from teaching students in general? If so, how? Research suggests that this population of students is different, but what does that mean? Should a teacher of these types of students do anything different? Should lessons be structured differently? As education students who plan on teaching in this area, these questions are relevant. For example, if these students do better with visuals, then it would make sense for teachers of these students to incorporate more visuals in a lesson. Regardless, if the lesson is math, English, art, history, science, or whatever subject, if these students prefer learning in some way, it makes sense for a teacher to modify lessons to meet these students where they are and use any learning preferences to aid in their learning. Three education students have researched learning preferences of low-socioeconomic rural Appalachian students. Based upon this research, students modified lessons for this population of students. Then, using an action research design, the Education students will use the Haldeman After School Program to determine if the lessons modified for this population are successful. Unfortunately, the Haldeman After School Program remained closed this year, due to COVID-19; therefore, collection of data is postponed until later in the year. Consequently, this presentation is only half of the action research project. Next year students will present their findings.

# Concurrent Oral Presentations

## Session 3

### ADUC 311

**Moderator: Dr. Philip Krummrich**

**10:00 - 10:15 a.m.      Napoleon's Egyptian Campaign: A Propaganda Mirage?**

OP-14

***Nathan Walden\**. Dr. Alana Scott, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

Napoleon Bonaparte's Egyptian campaign is one of the few instances of total defeat in the Corsican general's career. A combination of British naval superiority, uncooperative natives, and continued pressure from Ottoman armies forced the general to slip back to France under the cover of darkness. However, despite what seemed like a career ending failure he would go on to ascend to the highest levels of the French government before abolishing it and establishing the first French Empire. This presentation hopes to offer insight into the propaganda blitz employed by Bonaparte and his allies during his time in Egypt and, in order to scrub away his failures in subjugating the nation, in addition it will seek to connect these early propaganda outings to the tools the emperor would later employ to cement his rule. This will hopefully provide a clear picture of some of the soft power employed by a ruler whose rule was otherwise dominated by displays of hard power.

**10:15 - 10:30 a.m.      Napoleon Bonaparte The Personality Of Frenzied Passion And Royal Duty**

OP-15

***Brenna Murphy\**. Dr. Alana Scott, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

Napoleon Bonaparte was born August 15th, 1769. Despite coming from nothing and being an outsider, he would lead numerous successful military campaigns. He would rise in the ranks until he became the feared and loved emperor of France. Yet, while a well-known historical figure, he is still an enigma. Much is known about Bonaparte, but so much is focused his reign, his politics, and military achievements. This research aims to study Bonaparte as a person. His personality can be examined in an attempt to understand why Napoleon was and is a beloved but feared historical figure. The paper argues that he can be better understood by analyzing three important romantic attachments of Bonaparte, including that of Josephine Beauharnais, Archduchess Marie Louise of Austria, and Countess Marie Walewska. These romantic relationships reveal Bonaparte's need for love and power and how he confused the two feelings.

**10:30 - 10:45 a.m.      Napoleonic Tactics And The American Civil War**

OP-16

***Jeff Wysong\*. Dr. Alana Scott, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

The influence of Napoleonic tactics is directly linked to tactics used during the American Civil War. West Point trained officers of the pre-war army studied both the campaigns of Napoleon and the military theories of Baron Henri de Jomini, a general and former aide to Napoleon. This presentation will explore this connection between Napoleon and the American Civil War. Additionally, I will examine the direct influence of Napoleonic tactics and Jominian theory on the tactics used during the 1862 Shenandoah Valley campaign, the Chancellorsville campaign, 1862 Peninsula campaign, and the Vicksburg campaign. Taken together, this will hopefully illustrate the connection and influence of Napoleon on the tactics employed during the American Civil War.

**10:45 - 11:00 a.m.      British Foreign Policy During The 1920s**

OP-17

***Matthew Grace\*. Dr. Alana Scott, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

After the First World War, Britain's Empire showed all the signs of weakness. Its dominions vied for autonomy after their contributions to the war and its colonies sought independence and social reform at a time when the empire was weak. The ruins of the Ottoman Empire opened endless avenues for imperial control had had not been available in centuries, and Europe was on the verge of economic collapse. Using contemporary journals and primary sources and useful secondary materials, this paper will examine the climate of post-World War I British foreign policy in an attempt to further understand the difficulties and significance of decisions made for the sake of the British Empire in the 1920s.

**11:00 – 11:15 a.m. Break**

**11:15 - 11:30 a.m.      An Examination Of Joseph Bonaparte's Efficiency As King Of Spain**

OP-18

***Dylan Blankenship\*. Dr. Alana Scott, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

Napoleon Bonaparte is a man who is known across the globe and has been at the center of many different research studies. Less attention has been paid to his brother Joseph Bonaparte, however. Joseph Bonaparte was King of Spain from 1808 through 1813 during the Peninsular War. His rule has been seen as ineffective and as a failure by most historians. This presentation strives to provide the opposite view of Joseph Bonaparte's rule. Joseph is not the one to blame for Spain's instability under French rule during the Napoleonic Wars. This is due to his attempted reforms, his attempts to become accepted by the Spanish people, and his lack of ability to fix Spain's problems.

# Concurrent Oral Presentations

## Session 4

### ADUC 320

#### Moderator: Dr. Sylvia Henneberg

10:00 - 10:15 a.m. Translation Of Contemporary Latin American Poetry

OP-19

*Holly Hendrix\**. *Dr. Philip Krummrich, mentor, School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences*

I am involved in a year-long project to identify fresh voices in Latin American literature and to make some of their work available in English. I will read poems by Armando Maldonado, Milenka Torrico, and Paola Valverde, first in Spanish, and then in my translation, and offer brief comments on some of the challenges I faced in developing the English version.

10:15 - 10:30 a.m. The Spanish In The Carolinas: The Whole Picture

OP-20

*Hayley King\**. *Dr. Philip Krummrich, mentor, School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences*

Through this research project I analyze the influence and impact of Spanish colonization across the Carolinas and parts of Virginia. I have consulted archeological journals, Spanish court documents and reports written by Spanish explorers to their superiors, and peer-reviewed historical texts to gather my information. My goal is to create a clear picture of the Spaniards' footprint on this region of the Southeastern United States, examine the reasons behind their eventual loss of the territory, and touch on their interaction with and impact on the Native American population and culture there.

**10:30 - 10:45 a.m.      How Does Writing As Conversation Mediate How Appalachian High School Students Respond To Black Lives Matter #Ownvoices Literature?**

OP-21

***Kaytlyn Hicks\**. Dr. Alison Hruby, mentor, School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

The use of literature circles in high school classrooms has allowed for students to open a dialogue with one another and their teachers surrounding social issues and conversations happening all around them. Through the use of literature circles and the implementation of student choice when deciding what books to read and when each group would have their discussions, a high school teacher was able to facilitate discussions and open an important dialogue with her students. This presentation focuses on interview data from an ongoing study of antiracist teaching. The interview took place after a teacher's pilot run of a literature circles unit during the Fall 2021 semester and was conducted by my faculty mentor. The interview was aimed at gleaning the teacher's perspective on the success of the unit relative to its goals (i.e., having the students choose a book for engaged, self-motivated reading and for thoughtful discussion with peers around a social justice issue). I transcribed the interview and analyzed it with my faculty mentor. Findings indicate that the availability of the antiracist Young Adult literature books was vital for providing students opportunities for social justice discussions, but that the Literature Circles format was not associated with these discussions; rather, they took place "extracurricularly" -- with the teacher, outside of planned classroom activities. Implications for teaching will be offered in my presentation .

IRB Protocol # 21-10-47

**10:45 - 11:00 a.m.      Book Proposal: Oral Literacy**

OP-22

***Sydney Moore\**. Dr. Alison Hruby, mentor, School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

Oral literacy consists of a multitude of different methods of reading, including audiobooks, podcasts, and classroom reading by peers and teachers. The use of oral literacy in high school allows students to form community in the classroom, provoke creativity, and enhance comprehension. This idea is explored throughout the book that I am constructing with my faculty mentor by using classroom scenarios to find the role of oral literacy in students' behavior and growth as readers and writers. This book focuses on a high school that was placed under watch by the state of Kentucky due to low test scores and low college acceptance rates. One of the classroom scenarios featured highlights a poetry performance completed during the Poetry Unit from my student teaching semester. The scenario demonstrates how oral reading aides in comprehension: Students analyzed multiple literary devices used in a variety of different poems to fully understand the theme of their chosen poem. They used these poems and their comprehension of them to creatively share their poem orally with the class, using an outlet of their choice -- such as music, slam poetry, and other forms. This sharing scenario, along with others in the book focusing on other genres, showcases the benefits of oral literacy and how to incorporate it into the classroom. In my presentation, I will describe some of these scenarios and explain their benefits for fostering adolescent literacy development. This project involves no human subject data (no IRB)

**11:00 – 11:15 a.m. Break**

**11:15 - 11:30 a.m.      Program 60: Destined To Fail**

OP-23

***Nathaniel Bratzke\**, *Dr. Thomas Kiffmeyer, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

Despite its wealth in terms of natural resources, Appalachian Kentucky has suffered severe economic problems for over a century. From the "settlement schools" of the early twentieth century to President Lyndon Johnson's War on Poverty, policy makers at every level--county, state and nation--as well as private commercial interests have tried to address and thus solve Appalachia's economic issues. In 1960, the state of Kentucky launched "Program 60," its own economic initiative designed to save the region by fostering investment and infrastructure development. John Whisman, of the Eastern Kentucky Regional Planning Commission, composed Program 60 which advocated for the construction of a regional highway system and water and sewage facilities. Building upon this "infrastructure foundation," Program 60 called for a reconceptualization of traditional public economic policy. Rather than focusing on limited projects, Program 60 sought "total development" which included improved education, housing, health services, flood control, and economic diversification. Moreover, the plan called for the coordination of local, state, and national efforts into a unified effort for "strategic regional planning." In 1964, Whisman and his vision would find a home in the newly created Appalachian Regional Commission. Unfortunately, Program 60 failed to consider the economic history of the region and was bound to preconceived ideological notions about the viability of the market to solve its own problems. Suffering from its own structural defects and short-sightedness, Program 60 was "destined to fail."

**11:30 - 11:45 a.m.      Pro Se Divorce Clinic**

OP-24

***Gracie Davis\**, *Lindsey Stidam\**, *Dr. Laken Albrink, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

Morehead State University's Legal Studies program partners with Legal Aid of the Bluegrass to offer a clinic where individuals can complete the paperwork to file their uncontested divorce. The clinic serves people from Rowan and several surrounding counties. Divorces, even uncontested ones, can cost hundreds or thousands of dollars. With the help of Legal Studies students, the divorce clinic helps people who could not otherwise afford a divorce obtain one by representing themselves. Over the past year, the clinic process and procedures were examined with the aim of streamlining the process for clients and provide students broader and more extensive involvement in the divorce process. The clinic transitioned to a Legal Studies course. With the clinic on hold during the pandemic, it acquired a waitlist. By the end of the first half of the Spring 2022 semester with the clinic as a course, 87% of the waitlist had been assisted. There are 21 cases in progress and four finalized. Transitioning the clinic from a volunteer event to a course, enhanced the clinic experience for clients and student volunteers. Students received instruction on substantive and procedural divorce, practiced with the forms, re-examined the Kentucky Rules of Professional Conduct, visited the suit bank for professional attire, and were therefore more confident and better prepared to assist clients. The student coordinator attended clinics and make adjustments to the forms and process as the semester progressed. The changes to the clinic format were productive and allowed more individuals to be efficiently served.

# Concurrent Oral Presentations

## Session 5

### ADUC 321

**Moderator: Dr. Michael Dobranski**

**10:00 - 10:15 a.m.      Weights Of Bags Of Oranges**

OP-25

***Harrison French\*. Dr. Russell May, mentor, Department of Mathematics, College of Science***

We investigate the weights of bags of oranges with an advertised weight. The manufacturers are required to fill the bags to at least the advertised weight but never less. So, the actual weight often is more than the advertised weight. We assume the weights of individual oranges are random but follow the same distribution. We investigate two distributions for the bags: the weight of the bag in excess of the advertisement and the number of oranges in the bag. We created a program that repeatedly models filling the bag with oranges of random weights and then computes the mean, standard deviation, and graph of the distributions. We use probability generating functions, probability density functions and cumulative density functions to derive a theoretical distribution that matches the data from the program.

**10:15 - 10:30 a.m.      Morehead State University's Women's Basketball Statistics**

OP-26

***Sydney Sturgill\*. Dr. Chris Schroeder, mentor, Department of Mathematics, College of Science***

Statistics play a major part in sports analysis. Coaches, recruiters, gamblers, and even just fans of sports use statistics to manage playing time, recruit, or place bets. In this thesis project, our objective was to be able to use mathematical concepts to determine which players on a basketball team are the most effective on the court. To accomplish this, we analyzed changes in the score while each player was in the game, taking into account their teammates and opponents. We then created our own personal system for ranking the players based on their statistics and playing time. We will share the results of this analysis and talk about the challenges we encountered during the process.

**10:30 - 10:45 a.m.**

**Integrating Computer Science Topics Into Mathematics Education**

OP-27

***Dylan Grupe\****. *Dr. Joshua Qualls, mentor*, Department of Mathematics, College of Science

Mathematics and computer science overlap in numerous and significant ways. Articles dating back decades have called for including more mathematics in computer science education, and some sources include calls for inclusion of computer science topics in mathematics. This capstone project is a synthesis of these ideas in line with high school mathematics standards in an effort to better inform a practical use of computer science topics in the high school mathematics classroom. Topics include the production and use of algorithms and abstraction. In this talk I present examples of integrating and utilizing computer science ideas/analogies to introduce, support, and further develop high school mathematical concepts.

**10:45 - 11:00 a.m.**

**From The Chessboard To The Gridiron: Using The Elo System To Rank NFL Teams**

OP-28

***Andrew Hall\****. *Dr. Christopher Schroeder, mentor*, Department of Mathematics, College of Science

The Elo Rating system is a mathematical method commonly used in the rating of Chess players. It has since been adopted into various other forms of applications from online video games, to biometric software, to even dating websites. This presentation will focus on an overview of the Elo system itself and then look at how it can be applied to the 2021 NFL Season. We will analyze the results it provides and look briefly at some possible applications of the data including effectiveness with betting.

**11:00 – 11:15 a.m. Break**

11:15 - 11:30 a.m.

**Exploring The Connection Between Mindset And Place Identity In Appalachian High School Students**

OP-29

***Cera Clark\**. Dr. Robin Blankenship, mentor, Department of Mathematics, College of Science**

The idea of growth and fixed mindset was introduced by psychologist Carol Dweck, who became interested in how people react when presented with challenging puzzles. Mindset has recently become a popular topic in the education realm, and researchers are considering mindset to greatly impact academic achievement. If an individual possesses a growth mindset, they believe that they can be successful through hard work and determination. On the other hand, an individual who exhibits a fixed mindset believes their talents are innate gifts— that they can simply be "bad at math", for example. Researchers are looking at mindset as a contributor to academic achievement and are exploring how cultural identity may impact growth mindset.

This research stemmed from Dr. Amanda Slone's dissertation: "To See Ourselves: A Mixed Methods Study of the Relationship Between Place, Mindset, and Grit in Appalachian First Year College Students." It seeks to find patterns in mindset and grit among first-year college students in Appalachia and how students' place identity influenced these factors. For this project, we take a similar approach, but center the research on mindset patterns in Appalachian high school students. 56 students from Leslie County High School participated in this study. They were given the mindset survey designed by Dweck, a demographic survey, and were asked to identify characteristics they associate with Appalachian culture. This presentation showcases the data collected from this experiment and mathematically analyzes the data to dissect students' perceptions of mindset and place identity. IRB Protocol Number: 22-01-58

11:30 - 11:45 a.m.

**Developing Computational Exercise Sets For Probability And Statistical Mechanics**

OP-30

***Richie Knupp\**. Dr. Joshua Qualls, mentor, Department of Mathematics, College of Science**

In virtually all fields of mathematics and physics, one finds important and interesting problems of such complexity that traditional analytic approaches are difficult or even impossible. Numerical computation provides one path to progress. Additionally, knowledge and skills in programming, simulations, and modeling are needed by mathematics and physics graduates in a variety of careers. In this project, we developed curriculum and computational exercise sets about statistical mechanics, probability, random walks, probability distributions, expectation values, Monte Carlo simulations, and more. Our presentation will highlight specific computational exercises from this ongoing project.

# Concurrent Oral Presentation

## Session 6

### ADUC 322

#### Moderator: Dr. Wayne Miller

**10:00 - 10:15 a.m.**      **Design And Development Of Quantum Information Computational Projects**

OP-31

***Ashley Peters\**. Dr. Joshua Qualls, mentor, Department of Mathematics, College of Science**

Quantum information theory is the study of the information of the state of a quantum system or quantum computer. As a mathematical discipline, quantum computation can be described in terms of elementary linear algebra, quantum circuits, and complexity classes. Despite the growing interest in quantum information, adding quantum computation into a standard undergraduate curriculum is challenging for several reasons. In this research project, we have designed and developed quantum information computational projects for use in the MATH 375 "Mathematics of Quantum Information" and MATH 475 "Mathematics of Advanced Quantum Information" courses. Example projects include: (1) an introduction to creating and measuring qubits in Python, (2) an introduction to the Qiskit Python library for creating and calculating with qubits, and (3) basic quantum gates and circuits.

**10:15 - 10:30 a.m.**      **A Quantum Error Correcting Circuit Based On Classical Reed Solomon Codes**

OP-32

***Reid Johnson\**. Dr. Joshua Qualls, mentor, Department of Mathematics, College of Science**

Mathematical codes play an important role in daily life, from data compression/transmission/storage to cryptography. Due to either noise or malicious interference, information can develop errors leading to issues. Classical error correction employs clever redundancy to correct such errors, but the shift from classical codes to quantum codes poses new problems: copying quantum information is not possible due to the no-cloning theorem. Nevertheless, novel features of quantum information such as entanglement have led to the development of quantum error-correcting codes. We report our progress on developing and implementing a quantum Reed-Solomon error-correcting code mathematically in Python using the Qiskit software package.

**10:30 - 10:45 a.m.**

**A Project Based Learning Experience Investigating Tobacco Usage And Lung Cancer Rates**

OP-33

***Brooke Jones\**. Dr. William Tidwell, mentor, Department of Mathematics, College of Science**

The National Council of Teachers of Mathematics over the last two decades has encouraged teachers to provide opportunities for students to use mathematics to better understand the world around them. Unfortunately, teachers sometimes do not have the time to craft or the access to relevant project-based curriculum for their students. In this capstone, we discuss the creation of a relevant project-based unit for both middle and high school classrooms that will add to the limited curriculum available to teachers in the Eastern Kentucky region. These lessons guides students through an investigation of the relationship between tobacco usage and lung cancer rates in the United States. This capstone discusses equitable teaching practices incorporated into the lesson and mathematical approaches appropriate for middle school, high school, and university level students.

**10:45 - 11:00 a.m.**

**“What Is Game Theory?”: An Applied Mathematical Analysis Of Jeopardy!**

OP-34

***Noah Cooley\**. Dr. Michael Dobranski, mentor, Department of Mathematics, College of Science**

Game theory is the mathematical modelling of competitive scenarios between two or more players. It has applications in a wide variety of subjects: economics, political science, computer science, and, as in the case of this project, game show television. Over Jeopardy!’s thirty-seven-year run, there have been many champions renowned for their expansive knowledge of trivia, but unseen by many is their dominant strategic prowess, specifically with regards to Final Jeopardy wagering. One miscalculated wager can bring down even the strongest of opponents.

After independent research into this branch of mathematics, we used a theoretical approach to analyze the game of Jeopardy! as it is presented on television. Particular emphasis was placed on wagering strategies between two players in the Final Jeopardy round due to its variable nature. In this project, we decomposed the form of Jeopardy!, observed and suggested player assumptions, and calculated mixed wagering strategies. As novice game theorists, this allowed us to better understand applied game theory and under which situations it is most beneficial.

**11:00 – 11:15 a.m. Break**

11:15 - 11:30 a.m.

**Malware Detection In Smartphones Using Machine Learning And Deep Learning Techniques**

OP-35

***Suhana Ambol\**. Dr. Sherif Rashad, mentor, School of Engineering and Computer Science, Smith College of Business and Technology**

Current smartphone security methods offer less reliability and are prone to intrusion attacks. As an instance, the malware applications in smartphones can intrude via accessing a website, a scam SMS, downloading or installing certain applications. These applications unobtrusively record and steal data from the smartphone users. To deal with this issue, malware detection is applied which detects the presence of a malware on a host program and distinguish it as benign or malicious. The goal is to design a system that monitors and classifies malware and notifies the smartphone users in a better and efficient way. However, formulating an efficient malware detection system and classifying the malware are still challenging processes. The goal of this research project is to develop machine learning and deep learning techniques to detect malware and provide information about certain characteristics of malware. Various machine learning and deep learning techniques have been applied in this research project to resolve this issue. These techniques include algorithms such as Naïve Bayes classifier, Decision Trees, Random Forest, Artificial Neural Networks (ANN), and Convolutional Neural Networks (CNN). A publicly available dataset has been used to test and compare different algorithms and to calculate the accuracy of predicting the presence of a malware and the accuracy of classifying malware into groups. Experimental results are promising and the proposed approach can be implemented effectively for malware detection in smartphones.

11:30 - 11:45 a.m.

**Innovative Method For Translation Of American Sign Language Into Spoken Word Using Leap Motion Sensor And Machine Learning**

OP-36

***Jon Jenkins\**. Dr. Sherif Rashad, mentor, School of Engineering and Computer Science, Smith College of Business and Technology**

Real time translation of American Sign Language has been a long-standing project with many attempts. This research project seeks to solve issues of ease of use, portability, and accuracy using an innovative system combining the high-speed hand tracking of the Leap Motion Sensor with powerful machine learning algorithms. The system uses Unity, a real-time development platform, to interface with the sensors and Python programming language to run powerful modern machine learning techniques. Experimental results have shown high levels of accuracy and speed, while maintaining the inherent portability and ease of use of the sensors. The system works in an adaptive way to learn the way the individual signs each word within its vocabulary to allow for a much high level of accuracy than a general model for sign language recognition.

11:45 - 12:00 p.m.

**Centrality And Clique Detection In Social Networks Using Machine Learning**

OP-37

***Jacob Vogelpohl \**. Dr. Heba Elgazzar, mentor, School of Engineering and Computer Science, Smith College of Business and Technology**

The goal of this research project is to design and implement machine learning algorithms to analyze the dynamics of social networks. Unsupervised machine learning algorithms are used to analyze publicly available datasets to find clusters and create networks based on common interests. Centrality measures are used to determine influential nodes within the network and additional algorithms are used to identify maximal cliques. The results obtained from this research are promising and could be used for advertising purposes and for building smart recommendation systems.

# Poster Session

1:30 – 3:00 p.m.

## ADUC Ballrooms B & C

### "Semiclassical Mastermind"

P-1

*Curby Bair\**, *Alexa Cunningham\**, *Dr. Joshua Qualls, mentor, Craft Academy for Excellence in Science and Mathematics*

Games are often used in the classroom to teach mathematical and physical concepts. Yet the available activities used to introduce quantum mechanics are often overwhelming even to upper-level students. Further, the "games" in question range in focus and complexity from superficial introductions to games where quantum strategies result in decidedly nonclassical advantages, making it nearly impossible for people interested in quantum mechanics to have a simple introduction to the topic. In this talk, we introduce a straightforward and newly developed "Semiclassical Mastermind" based on the original version of mastermind but replace the colored pegs with 6 possible qubits ( $x+$ ,  $x-$ ,  $y+$ ,  $y-$ ,  $z+$ ,  $z-$ ). We allow the user to make 9 guesses with 1 final answer, forcing the user to make strategies to have the best chance of getting a correct answer. We report on the mathematical analysis of three strategies for play and conclude by previewing how a "quantum" player could potentially outperform even optimal "classical" players.

## **Pressure Injuries In A Clinical Setting: A Quality Improvement Project**

P-2

***Kayla Blain\*, Clarissa Baker, Colby Pugh\*, Jarrett Elam, Chloe Patrick, Mackenzie Hopkins. Dr. Mary White, mentor, Department of Nursing, College of Science***

The purpose of this quality improvement project is to develop a teaching tool aimed at decreasing the incidence rate of pressure injuries in the clinical setting specifically those in intensive care settings. Pressure injuries are a common preventable hospital-acquired complication. The occurrence of pressure injuries is higher in an ICU setting than in a non-ICU setting with 30% and 27.6% respectively during a one-year time period. The development of a teaching tool to be distributed to nurses' stations, staff workrooms, and nurse managers seeks to improve ICU staff nurses' education on the topic of pressure injuries at a large urban teaching hospital.

## **Funding Achievement In Kentucky**

P-3

***Brett Blair\*. Dr. James Masterson, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

There is a commonly held belief that increased funding in education leads to improvements in educational outcomes. Educational funding disparities is a concept known all too well between the various school districts within Kentucky, and thus provides an ideal foundation for the presence of such research on educational outcomes. This study represents an effort to reveal the connection that exists between different levels of educational funding within Kentucky and the subsequent educational outcomes experienced as a result. The necessity of this study is derived from the inconsistent and unspecific literature that exists on the topic. The study is designed to analyze educational inputs, and respective outcomes, using data from the Kentucky Department of Education's annual publication of the Kentucky School Report Card data sets using a multi-year structure. This application of time as a variable allows the study to isolate the effects of other relevant variables on educational achievement, providing a more specific and accurate image of the effects taking place. The measures chosen as dependent variables for this study were the ACT and KPREP testing results produced by Kentucky's school districts, seeing as these are common measures by which the educational performance of students in Kentucky can be assessed. These dependent variables can be affected by a number of relevant demographic variables that will be controlled for throughout the course of the study, isolating the effects of our main independent variables: total spending per student, instructional spending per student, and the ratio of computers per student within the school.

## **Pressure Ulcer Prevention In A Small Rural Teaching Hospital: A Quality Improvement Project**

P-4

***Noah Blevins\*, Graci Borders\*, Brett Bentley\*, Carly Crutchfield\*, Rachel Dillon\*, Jacob Dyer\*, Haleigh Eldridge\*, Taylor Emmons\*. Dr. Mary White, mentor, Department of Nursing, College of Science***

A pressure ulcer is an injury that affects the underlying tissue and skin, and is primarily caused by prolonged pressure on the skin. During a clinical rotation at a small rural teaching hospital, pressure ulcers were prevalent in an estimated 80% of patients in the intensive care unit (ICU) during a three week period. Approximately \$26.8 billion are spent every year in the United States treating pressure ulcers. The purpose of this quality improvement project is to provide staff education to ICU nurses in order to reduce and prevent the prevalence of pressure ulcers in patients. A thorough literature review was completed on 64 studies related to pressure ulcers that focused on causes, effects, costs, education, treatments, and preventative measures. An educational tool was developed that outlines interventions that targeted pressure ulcer prevention

## **Love And Education In Plato's Symposium**

P-5

***Brooke Boggs\*. Dr. Timothy Simpson, mentor, Department of Early Childhood, Elementary and Special Education, Volgenau College of Education***

This paper seeks to illuminate the significance of Socrates' entrance into a series of speeches by exploring the connection between love and learning in Plato's Symposium. We begin by presenting historical and social contexts relevant to the dialogue and its author. We then turn to the dialogue, outlining the fundamental components of each speech and, moreover, analyzing each speech with the aim of eliciting educational implications which are later highlighted and expanded on by Socrates. We examine these pedagogical connotations through a thorough investigation of each speech, keeping a keen eye on Socrates. We approach our examination of Socrates' speech in two key ways. The first is to examine how the educational implications found within the earlier speeches are later acknowledged and expanded on by Socrates. Furthermore, we also examine the way in which Socrates forms careful alterations of the previous speakers' assertions to provide them with new meanings. Second, we examine Socrates' approach in contrast with the prior speeches. In our examination of Socrates' speech, we find that the structure of Socrates' speech sharply contrasts with the overall narrative formatting of the prior speeches and the dialogue as a whole. We argue that Plato deliberately emphasizes Socrates' approach by constructing a structure that contrasts with previous speeches. For further support of our interpretation, we turn to additional Platonic dialogues with the intent of gaining further insight into his educational approach.

## Beetle Diversity Within Ecosystems; Insight Of The Order Coleoptera In The Eastern Kentucky Region

P-6

***Blake Branham\*, Hannah Pyles\*, Kelsey Sowders, Mallory Baker. Dr. Charles Lydeard, Dr. Sean O'Keefe, mentors, Department of Biology and Chemistry, College of Science***

Having a multitude of definitions, biodiversity can most commonly be seen as the variety and diversity of life within an ecosystem. Its relevance is crucial for species survival and resource availability; a lack of biodiversity sets an ecosystem up for failure, reducing its productivity, species richness, and increasing organismal vulnerability. Measuring biodiversity is crucial for the understanding of an ecosystem's health, giving scientists knowledge of its stability, productivity, and persistence. This collected information can be implemented in various ways outside the scientific field as well, such as with policy decisions and legal regulations. Biodiversity is most commonly analyzed through quantitative assessment of mammal and bird species, but the relatively low numbers of species and few individuals in defined areas tend to cause flawed statistical results. Beetles, however, can be found in large numbers in just about all ecosystems. Having an immense diversity of species, they play significant purposes in environments, filling ecological roles as herbivores, decomposers, predators, coprophages, fungivores, etc. As beetles are tremendously diverse and very abundant, quantitative assessments of their diversity are more statistically rigorous. We are sampling beetles from 3 sites located near Morehead, KY. Beetles were collected using pan traps and leaf litter sifting. Collected beetles were then pinned or pointed and sorted by family groups. The primary focus of the study was to determine the various beetle species and their quantitative presence within the multiple sampling sites.

## Effects Of Computer Or Paper Presentation And Preference On Persistence

P-7

***Johnna Brown\*, Reganne Miller, Daisy Pratt, Madison Cornelius. Dr. Gregory Corso, mentor, Department of Psychology, College of Science***

Preference and task persistence using computers or paper were investigated. We hypothesized that participants would spend more time in task conditions aligning with their media preference. Participants (n=25) indicated if they preferred paper or computer for assignments. Participants were instructed to solve five easy, five difficult, and five unsolvable anagrams using either a computer or a paper/pencil presentation first and then using the remaining media for the second series. The solvability and difficulty level of the anagrams were unknown to the participants. The dependent variable was the total time solving the anagrams per difficulty level for each media condition. Persistence was defined as the time spent attempting to solve unsolvable anagrams. Data analysis showed a significant latency difference in each of the three difficulty sets, ( $F(23,46) = 13.865, p < .001$ ), and there were significant latency differences for the three sets but an overall greater latency in the paper series, ( $F(23,23) = 8.160, p = .009$ ). Additionally, it was hypothesized that energy expenditure, measured using a modified version of NASA-TLX, would vary for the different difficulty levels, and that participants would exert more mental energy for the media they preferred. Participants rated energy expenditure after the completion of the Easy anagram set and then again after the completion of the Unsolvable anagram set. There was a difference in the pre-survey and post-survey scores in both conditions, ( $F(23,23) = 60.304, p < .001$ ), with greater scores in the paper-first condition. IRB Protocol Number: 21-08-08.

## The Influence Of CEO Gender On Firm's Competitive Intensity

P-8

***Caitlyn Burdine\*, Peyton Rose\*. Dr. Ahmad Hassan, Dr. Fatma Mohamed, mentors, School of Business Administration, Smith College of Business and Technology***

We contributed to the ongoing debate about the existence of a female leadership advantage by examining the effects of a female CEO on firm competitive intensity. Role congruity theory predicts that at executive levels in organizations, the contrast between the agentic characteristics, which capture achievement-oriented tendencies attributed to the male leader and the communal attributes, which capture concern with the welfare of others associated with the female gender role would be so pronounced that women who occupy top leader roles would be extremely disadvantaged when compared with their male colleagues. On this basis, a woman-led company is expected to compete less intensely than a man-led company. However, research on double standards of competence provides reason to expect that a woman's presence in a CEO role, a highly masculine role, provides information about her abilities: specifically, that she must be exceptionally competent to have attained success in a role that requires such agentic traits. Thus, a woman-led company is expected to compete more intensely than a man-led company because of the perception that she must have had to meet or exceed exceptionally high standards. We measured the intensity of competitive action as the total number of competitive actions initiated by a firm. The sample consists of 40 dual-firm competitive rivalries between a broad cross-section of firms in the Fortune 500 over the three-year period. Each dyad consists of one woman-led company and its closest man-led rival. The result showed that a woman-led company competes more intensely than a man-led company.

## The Eastern Kentucky Arts Project Website

P-9

**Taylor Burnette\***. *Dr. Joy Gritton, mentor, School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences*

The Eastern Kentucky Arts Project (EKAP) was founded in 2007 as a way to connect communities in Eastern Kentucky through the visual and performing arts. EKAP aspired to bring Appalachian arts to a wider audience, while at the same time providing local residents, including educators, with information about the rich history and cultural resources in their area. The EKAP website was launched eleven years ago, and engaging a younger generation is now requiring a total website redesign that better integrates social media and adds new features, such as Instagram. This update affords an opportunity to explore ways to serve the region by envisioning new strategies for linking website visitors with knowledge about their home (including historic architecture, oral histories, and archived music recordings). Being able to highlight current art and music movements and feature new oral histories, while managing large amounts of assembled data and numerous resource links, are part of the goals of the new redesign, as well. This poster will trace the presenter's study of concept design and technical strategies used by regional, national, and international website designers who have successfully met similar challenges and outline the ways she has applied this research to a redesign of the EKAP website. She hopes to foster improved quality of life in the region through creating culturally sensitive and effective web design.

## Genes Involved In Cell Division In *Acinetobacter Baumannii* Are Coregulated By Umu D Ab And Ddr R

P-10

**Belinda Candra\***. *Dr. Eric Rouchka\*\*, Dr. Janelle Hare, Dr. Xiaohong Li\*\*, mentors, Department of Biology and Chemistry, College of Science, Bioinformatics Core\*\*, University of Louisville, Bioinformatics Core\*\*, University of Louisville*

In the presence of DNA damage, the multi-drug resistant bacteria *Acinetobacter baumannii* employs the proteins UmuDAb and DdrR to repress the expression of error-prone polymerases. However, recent evidence suggests that they may also affect the phenotypes of cell division inhibition and growth sensitivity after DNA damage. To examine the expression requirements of the bacteria's cell division genes, we re-analyzed our previously acquired RNA-Seq data from wild-type, *ddrR* mutant, and *umuDAb* mutant strains. Then, we analyzed Cuffnorm- or HTSeq- normalized counts of the expression of 35 putative cell division genes obtained from the KEGG database using the Cuffdiff and DESeq2 pathways, respectively. Differential expression after DNA damage is signified by  $q$  value  $< 0.05$ . We observed the derepression of site-specific tyrosine recombinase *xerC* and induction of topoisomerase IV/Type II toxin(/antitoxin) *parE* in both mutants, and derepression of septal ring lytic transglycosylase *rlpA* in the *ddrR* mutant. *XerC* and *ParE* function at a DNA damage-associated filamentation locus in *Escherichia coli*. *XerC* and Topoisomerase IV also interact with cell division protein *FtsK*. RT-qPCR experiment confirmed this *ddrR* dysregulation in *parE*, *xerC*, and *rlpA*. To follow up on these results, we are constructing mutants with disruptions in these genes to observe their resulting cell division and growth phenotypes. These results may also help test whether DdrR and/or UmuDAb regulate these genes.

## **Rainwater Harvesting On The Derrickson Agriculture Complex**

P-11

***Hannah Clatos, Riley Williams. Dr. Vijay Subramaniam, mentor, Department of Agricultural Sciences, College of Science***

Economic and financial feasibilities of rain-water harvesting systems at Derrickson agricultural complex Morehead State University (MSU) has designed and installed four rainwater-harvesting systems on MSU's Derrickson Agricultural Complex as a demonstration site for the best management practices. The systems collect rainwater for four purposes (1) Hog Gestation House Cooling Pad System which collects rainwater from (about 1,200 square foot) roof of hog gestation house and stores the water in two 1500 gallons tanks, (2) Green House Cooling System which collects water from an existing green house, and the collected water is used for cooling the green house during summer months, (3) Bull Barn Rainwater Collecting System which uses the collected water as a source for drinking water for cattle, and (4) An existing pond was renovated and developed into a water distribution system to provide drinking water for cattle. This study discusses all four water harvesting systems and examines economic and financial feasibilities of two (Bull-Barn and pond) systems. The research also assesses if these strategies are economically warranted management practices in the Eastern Kentucky region.

## **Research, Testing, And Validation Of Small Satellite Designs: Cube Sats, Can Sats, Pocket Qubes, And Femtosatellites.**

P-12

***Jason Combs\*. Mr. Jose Garcia, mentor, Department of Physics, Earth Science and Space Systems Engineering, College of Science***

The focus of this project, through research and testing, was to prepare various elements of small satellite experiential education curriculum. Rather than be constrained to the expensive and long-term timelines of a larger satellites, students can assemble, test, and operate various classes of small satellites in a valuable learning experience that will prepare them to work on larger projects. The true benefit of a PocketQube, CanSat, or femtosatellite is that they can be built with less money, less experience, and less long-term commitment while providing a scaled version of the real-life satellite development process that will engage and inspire students. One already tangible result of this project is a thirty-page illustrated handbook that instructs students how to use open-source coding software to verify PCB (Printed Circuit Board) construction, how to troubleshoot difficulties when testing the seven different families of satellite subsystems, and the steps for physical manipulation to validate the sensors of the subsystems. Also important for this project was over twenty-five hours of research cataloging the RF (Radio Frequency) products of more than seventeen different manufacturers to evaluate their impact on small satellite designs. Ongoing research into the standards currently used by this industry will provide useful results to develop small satellite components. The research in this project will speed the development of exciting small satellite projects that will be used to show students the basics of satellites at universities far beyond the mountains of Kentucky.

## **Novel Gain Of Function Mutations In The Telomerase RNA Of Saccharomyces Cerevisiae**

P-13

***Keenan Conley\**, *Madison Frazier\**. *Dr. Melissa Mefford, mentor*, Department of Biology and Chemistry, College of Science**

Linear eukaryotic chromosomes have specialized regions at their ends called telomeres. During DNA replication, telomeres are not fully replicated which leads to a shortening of chromosomal DNA that contributes to the process of aging. To counteract this issue, most eukaryotic organisms express the enzyme telomerase. Telomerase is a ribonucleoprotein complex that extends telomeres during DNA replication. Telomerase, however, can cause harm to an organism as increased levels of telomerase enzyme are observed in >85% of human cancers. As described above, telomerase is crucial to the development and homeostatic maintenance of an organism; yet, the structure and function of telomerase RNA is not completely understood. To better understand telomerase RNA, we developed a genetic approach to identify novel gain-of-function (GOF) mutations in telomerase RNA. First, we created a library of ~5,000 random telomerase RNA variants using error-prone PCR. After transforming these mutants into yeast as the sole copy of telomerase RNA, we took advantage of the telomere position effect (TPE) to identify yeast with longer telomeres. With TPE, silencing of a marker gene inserted near a telomere is greater with lengthened telomeres, which we can select for by better growth on media containing a counter-selectable drug. To date, we have screened ~20,000 yeast colonies containing our mutant library. From this, we identified ~48 putative GOF mutants, 16 of which have been validated as true GOF mutants. We are currently working to directly measure telomere lengths via Southern Blotting, as well as identifying the specific mutations that cause GOF.

## **Combating Nursing Burnout: A Quality Improvement Project**

P-14

***Cailey Dahlquist\**, *Heather Randolph\**, *Jenna Bartley\**, *Addie Short\**, *Madelyn McElfresh\**. *Dr. Mary White, mentor*, Department of Nursing, College of Science**

Burnout within the nursing field has become a progressive issue that has negative effects on both workers within health care and patient outcomes. This quality improvement project aims to improve patient outcomes while improving mental health for nurses. A literature review of 40 studies was completed to investigate burnout among nurses. This review indicated that nurses are overworked while lacking adequate resources to prevent burnout. This issue needs to be addressed especially due to the current pandemic resulting in increased patient admission rates and high patient acuity. The quality improvement project resulted in development of an educational tool designed to address the issue of nursing burnout among staff at a large urban teaching hospital. This tool will be shared with nursing staff and placed within nurses' stations to increase awareness and provide interventions to combat nursing burnout.

### **Comfort Women: The Climax That Exposed Japanese Culture**

P-15

***Olivia Dale\**, Dr. James Masterson, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

When a nation attempts to erase the history of a marginalized group, the preservation of such narratives becomes critical. The genuine culture of a nation is exposed when that which officials attempted to hide is analyzed. The comfort women scheme conducted by the Imperial Japanese Government serves as an example of this phenomenon. The comfort women system was more than sex trafficking; it was the climax of a sexist society. Japan had a long history of organized prostitution before the Second World War, but during the conflict, the demeaning actions committed against women extended beyond the nation. The Japanese government insists its history is one of honor, but to provide supposed essential comfort to Japanese soldiers, it destroyed the lives of countless women. The Japanese government is responsible for the largest state-sponsored sex trafficking scheme in modern history; such a structure does not develop quickly. The Imperial Army comfort women system augmented the long-established sex industry by pushing the establishment to be more barbaric, extensive, and global. The wounds inflicted by the age-old sex scheme further deepened during the Second World War and were then neglected; because of this, the system continues to plague the political history of Japan.

### **Analytical Method Development For The Analysis Of E Liquids**

P-16

***Calista Dean\**, *Charlotte Gabbard\**, Dr. Emma Schmittzehe, mentor, Department of Biology and Chemistry, College of Science**

Electronic cigarettes are one of the most commonly used methods of nicotine delivery, especially among the adolescent population. Due to the lack of regulation in manufacturer labeling of refillable nicotine solutions (e-liquids), the actual concentration of nicotine and other additives is variable as compared to the reported values. Misreporting of nicotine content is a contributor in the development of nicotine dependency and potentially tobacco product dependency. The objective of this research is to develop reliable analytical methods to study the variations in nicotine levels in e-liquids, and to identify and quantify other potentially harmful additives in e-liquids. In this research we used gas chromatography-mass spectrometry (GCMS) and nuclear magnetic resonance (NMR) spectroscopy for identification of compounds, and we used high-performance liquid chromatography (HPLC) and GCMS for quantification of compounds.

## Frequency Of Genetic Variants At The Mc1 R Locus In a Student Population

P-17

*Emmalea Dowdy\**, *Grace Stubblefield\**. *Dr. David Peyton, mentor, Department of Biology and Chemistry, College of Science*

The Melanocortin-1 Receptor gene (MC1R) encodes a protein that is associated with pigmentation in vertebrate animals. An extraordinary number of variations in this gene have arisen over time due to the importance of pigmentation in camouflage, photosensitivity, vitamin D production, and other evolutionary factors. Variations in the MC1R gene sequence became important to survival as humans migrated out of Africa and into cooler climates with less sun exposure, where lighter skin pigmentation (and therefore more vitamin D production) was key to survival. These genetic variations continue to exist in modern humans. Recent research into the MC1R gene variations in different human populations shows that variants occur at different frequencies, for example a variant named "R151C" occurs in about 5% of humans of European descent, but is not detected in humans of Asian descent.

For several years in the undergraduate Genetics course (BIOL 304L), students have collected and sequenced a portion of their MC1R gene to identify the presence or absence of variants. The results have been limited to the in-class analysis, and no data from the samples have ever been used in any type of publication or presentation. Here we analyze the de-identified aggregate data from eleven semesters (fall 2011 through spring 2016, representing roughly 500 individual sequences) to discern the frequency of variants in our data. We compare our findings to existing data from other populations and draw conclusions about why we see the frequencies that we do in our student population.

## A Meta Analysis Of Quantitative Collecting Techniques For Spiders

P-18

*Eliana Eldridge\**, *Joshua Hicks\**. *Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science*

Quantitative sampling of organisms is often used to provide information in ecological studies, monitor populations, and aid in biodiversity projects. A large number of studies involve the quantitative sampling of spiders. In this meta-analysis study, 207 peer-reviewed journal articles formed the basis of an initial data set for a quantitative analysis of spider collection techniques. Data collected included country of study, mode of study, trapping techniques used, spider diversity, and number of specimens collected. In our meta-analysis, studies from 33 different countries were included. Trapping techniques vary by habitat in which spiders dwell. These were divided into aerial, arboreal, terrestrial, and subterrestrial. From the gathered data, 5% of the articles included aerial trapping, 20% included arboreal trapping, 1% included subterrestrial trapping, and 80% included terrestrial trapping. 60% of the terrestrial studies utilized pitfall trapping, while 20% used hand collecting, 15% used sweep netting, and 5% used branch-beating.

## **Seasonal Abundance And Sex Ratio Of Earwigflies (Merope Tuber) In Eastern Kentucky**

P-19

**Abigail Fagan\*, Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science**

The earwigfly is a rarely seen insect in the family of scorpionflies. There are three species total, one in Brazil, one in Australia, and the third (Merope tuber), widespread throughout the eastern United States. In a 1984 study, Chris Maier collected 69 earwigflies between 1977 and 1982 from New England. Most of these were collected in July using sticky traps. He collected 43 females and 26 males (sex ratio 2.4:1). In a 2014 study, Skvarla, Hartshorn, and Dowling collected 77 earwigflies from Arkansas mostly in August using malaise traps, pan traps, Lindgren funnels, and pitfall traps. They collected 58 females and 24 males (sex ratio 1.65:1). Over the course of two field seasons in 2011 and 2012, we collected over 500 earwigflies from pan traps, which is the largest collection in the world that we know of. We collected 339 females and 165 males, which is roughly a 2.05:1 sex ratio. It seems that earwigflies in Eastern Kentucky are most abundant in late August and early September. Our results are similar to those of Maier and Skvarla, Hartshorn, and Dowling with their smaller data sets. We plan to use statistical analysis to better evaluate seasonal variance of earwigflies.

## **Fungi In A Warmer World – Fungal Diversity In The Tropical Middle Miocene Climate Optimum Of The Clarkia Region Of Idaho, Usa**

P-20

**C. Jolene Fairchild, Libby Lennex-Stone\*, Taylor Horsfall, Laikin Tarlton, Savannah Jones, Abigayle Caldwell, L. Olivia VanderEspt\*, Liberty Smallwood, Alyssa Patel\*. Dr. Ingrid Romero\*\*, Dr. Jen O'Keefe, Dr. Matthew Pound\*\*, Dr. Noelia B. Nuñez Otaño\*\*, mentors, Department of Physics, Earth Science and Space Systems Engineering, College of Science, Facultad de Ciencia y Tecnología, Laboratorio de Geología de Llanuras\*\*, Universidad Autónoma de Entre Ríos / CICyTTP (CONICET-UADER-PROV.er), Department of Geography and Environmental Sciences\*\*, Northumbria University**

Microfungi are a key component of ecosystems as they are one of the main drivers of plant diversity and nutrient cycling. Understanding extant fungal assemblage composition in relation to climate allows us to apply the co-existence approach to fossil fungal records. This provides a powerful tool for interpreting local changes during the Miocene Climatic Optimum (MCO), as unlike many botanical proxies, fungi tend to be preserved very close to their original substrate. This paper focuses on the fungal diversity in samples collected from the well-studied Clarkia lagerstätten of Idaho, USA. The assemblage is very diverse, and contains examples of all fungal trophic modes. This study is among the first from Clarkia to apply the co-existence approach directly to fossil fungi, and as such is foundational to the assembly of a long-term, large-scale database of MCO fungal assemblages used to model paleoclimates and predict future fungal assemblage dynamics with climate change.

**Fungi in a Warmer World - Fungal diversity from the Peak Warming of the Miocene Climate Optimum as recorded in the Latah Formation, Clarkia, Idaho, USA**

P-21

***C. Jolene Fairchild\**, *Dr. Jen O'Keefe*, *Dr. Ingrid Romero\*\**, *Dr. Matthew Pound\*\**, *Dr. Noelia Nuñez Otaño\*\**, *Dr. Sophie Warny\*\**, *mentors*, Department of Physics, Earth Science and Space Systems Engineering, College of Science, Facultad de Ciencia y Tecnología\*\*, Universidad Autónoma de Entre Ríos, Sede Diamante, CICyTTP (CONICET-UADER-Prove.ER), Geology and Geophysics\*\*, Louisiana State University, Department of Geography and Environmental Science\*\*, Northumbria University**

Microfungi are key contributors to ecosystems through nutrient cycling, but they are often overlooked in biodiversity-related studies. Due to this, it is vital to document how microfungi diversity and abundance are affected by warming climates so that a predictive model can be developed. To do this, long-term datasets derived from the fossil record are needed. Microfungal fossils are often preserved close to their original substrate, so studying variation in their assemblages through time can offer a more complete and locally accurate record of the impact of climate change on ecosystems. This is incredibly useful when looking at the Miocene Climatic Optimum (MCO), which can be used as a proxy for current climate change. This paper focuses on fungal assemblages found in thirteen samples taken from a Middle Miocene age (Langhian; ~15-15.5 MA) lake bed in Clarkia, Idaho, USA. Previous studies done in the area suggest that the area was a warm temperate to subtropical climate with high biodiversity at the time of deposition. Here we present preliminary data from this high-resolution study of fungal diversity during the peak warming period of the MCO.

## **A Sustainable Approach To Compostable Package Identification**

P-22

***Kiera Fehr, Dr. Lokendra Pal\*\*, Dr. Rachel Rogers\*\*, mentors, Craft Academy for Excellence in Science and Mathematics, PSE Department\*\*, NC State***

Ink labeled corrugated boxes are used worldwide to ship, identify, and promote products. Currently, ink printed identification codes and colorful marketing messages adhered to corrugated boxes are responsible for producing most volatile organic compounds (VOCs) released into the atmosphere and contaminating wastewater resulting from the manufacturing and recycling of these boxes. I created a compostable ink and combined it with a laser engraving process to accurately label corrugated boxes that are comparable to current petroleum-based ink labeled boxes on the market. My identification labels can be removed using only hot water and agitation during the recycling process and will not result in contaminated wastewater. This product is environmentally friendly and can be added directly to a compost pile. The resulting biological breakdown of this compostable ink printed, and laser engraved board will not contaminate soil or groundwater. Although the use of chemically added glues and water-resistant coated corrugated liner contribute to a much smaller percentage of contamination, the goal of this project is to completely eliminate all contamination resulting from the production and recycling of ink printed corrugated boxes. The combination of laser engraving, plant based colored ink, and natural glue resulted in a durable and water-resistant corrugated board that introduces an alternative to existing ink printed corrugated boards on the market. The environmentally friendly materials required for production are readily available, renewable, and low cost.

## **Morphometrics Of The Rare Earwigfly Merope Tuber**

P-23

***Nicholas Finch\*, Dr. Sean O'Keefe, mentor, Department of Biology and Chemistry, College of Science***

Merope tuber Newman (Mecoptera: Meropeidae) is a rare North American species of earwigfly, which is closely related to common scorpionflies. "Earwigfly" refers to three different species: the Western Australian *Austromerope poultoni*, the South American *Austromerope brasiliensis*, and finally, the Eastern North American *Merope tuber*. This last species was the focus of our study. Johnson's 1995 study was based on 160 earwigflies, where he measured the female abdomen length, male and female forewing length, and male basistylus and dististylus length. In their 2014 study, based on 82 earwigflies, Skvarla, Hartshorn, and Dowling measured head width, pronotum width, forewing length, abdomen length, basistylus length, and dististylus length. In our study of 504 earwigflies, we are measuring head width, pronotum length, pronotum width, pterothorax length, abdomen length, forewing length, basistylus length, and dististylus length. This project was started in February, at this point we have measured about 2/5 of the specimens. This collection of 504 earwigflies is most likely the largest collection of any earwigflies in the world, and provided an excellent dataset for a comprehensive morphometric analysis. We plan to incorporate morphometrics to our measurements and seek to corroborate our results with previous findings.

**Genes Repressed After Dna Damage In Acinetobacter Baumannii Are Co Regulated By Umu D Ab And Ddr R**

P-24

***Mollie Flannigan\**, *Dr. Eric Rouchka\*\**, *Dr. Janelle Hare*, *Dr. Xiaohong Li\*\**, *mentors*, Department of Biology and Chemistry, College of Science, Department of Biochemistry and Molecular Genetics\*\*, University of Louisville , Department of Biochemistry and Molecular Genetics\*\*, University of Louisville**

UmuDAb and DdrR coregulate error-prone polymerases in the multi-drug resistant opportunistic pathogen, *Acinetobacter baumannii*, by repressing polymerase expression until after DNA damage. New evidence indicates that these proteins could also regulate other genes that are repressed following DNA damage. We performed an in silico analysis of RNA-Seq data from wild-type, *ddrR*, and *umuDAb* mutant strains to examine the expression levels of genes repressed after DNA damage. We used two different algorithms to analyze Cuffnorm- and HTSeq normalized gene counts. This analysis revealed nineteen (using the CuffDiff algorithm) or twenty-nine (DESeq2) genes repressed in wild-type cells that were no longer repressed after DNA damage in either one or both of the mutant strains. The proteins encoded by these genes include an induced acetoin metabolism operon, a putative YfbU family member (often required for MazF-mediated cell death after DNA damage), RlpA (a septal ring lytic transglycosylase), and a putative cold-shock protein. We carried out RT-qPCR verification of the RNA-Seq data and found that these genes are dysregulated in the mutant strains after DNA damage, indicating DdrR and UmuDAb's regulatory functions. Upon completion of RT-qPCR, we will construct strains containing mutations in these genes to test if DdrR and UmuDAb co-regulate these repressed genes. This will aid us in our understanding of how their downregulation may be involved in the pathogen's response to DNA damage-induced stress.

## Survey Of Spiders Within Eastern Kentucky

P-25

***Mercy Hailu\**, *Eliana Eldridge*, *Joshua Hicks*, *Bailey Bullock*. *Dr. Sean O'Keefe*,  
*mentor*, Department of Biology and Chemistry, College of Science**

Biodiversity is known to be the variation of living organisms comprising several levels, beginning from genes, then species, communities, then finally ecosystems. Biodiversity is crucial in maintaining ecological balance, boosting ecosystem productivity, and determining the quality of ecosystem services such as pest management in agriculture. Being aware of biodiversity's importance can also help with the prevention of continuous threats to biodiversity and be best prepared to manage conservation challenges. Typically, mammals, birds, and plants are used to assess biodiversity. However, spiders may be effective in indicating environmental change because they are taxonomically quite diverse, species fill a variety of ecological niches, and they are easy to trap. Spiders can also be very numerous and reflect the heterogeneity of their environment. We assessed spider biodiversity within Eastern Kentucky using pan traps, net hunting, and sifting leaf litter. We have collected a couple thousand spiders so far and identified spiders from 20 families, including Agelenidae (grass spiders), Antrodiaetidae (Folding door Spiders), Anyphaenidae (ghost spiders), Araneidae (orb-weaver spiders), Atypidae (pursue-web spiders), Clubionidae (sac spiders), Ctenizidae (trapdoor spiders), Dictynidae (mesh web spiders), Dysderidae (Woodlouse Spiders), Hahniidae (dwarf sheet spiders), Linyphiidae (money spiders), Lycosidae (wolf spiders), Oxyopidae (lynx spiders), Philodromidae (running crab spiders), Pholcidae (cellar spiders), Pisauridae (nursery-web spiders), Salticidae (jumping spiders), Tetragnathidae (long-jawed orb weaver spiders), Theridiidae (tangle-web spiders), and Thomisidae (crab spiders). Most spiders that were found are Wolf Spiders (Lycosidae) whereas Antrodiaetidae (folding door spiders) and Atypidae (pursue-web spiders) were very rare. We have also discovered 3 genera of tarantula cousins.

## Classification Of Stroke Victims Through Supervised Machine Learning Algorithms And Ensemble Learning

P-26

***Dalton Hensley\**. *Dr. Heba Elgazzar*, *mentor*, School of Engineering and  
Computer Science, Smith College of Business and Technology**

This research explores several contemporary methodologies for classifying stroke victims using an aggregate of ensemble learning and a myriad of other supervised machine learning strategies. To this end, the research presented makes explicit use of bagging and boosting techniques to strengthen classification efficacy. Several supervised learning algorithms are utilized to perform the classification process. The Python programming language with its respective machine learning libraries were used to design classification models and generate illustrative graphics. The experimental results, as discussed in greater detail in this research, show that conditions such as stroke can be effectively classified with considerable high accuracy and precision. Thus, this body of research explores several methodologies within machine learning that enable the classification of two distinct classes: absence or presence of a history of stroke.

### **Short Term Hunger State And Muscle Fatigue**

P-27

***Ethan Hackney, Hannah Hostetler\*, Chyann Sargent. Dr. Ilun White, mentor, Department of Psychology, College of Science***

Muscle fatigue can lead to unstable movements, decreased endurance, and heightened risks for injuries. Previous reports indicate that muscle fatigue may be worsened during long-term hunger state, leading to greater risks. The present study examined the effects of short-term hunger on muscle fatigue, using EMG recording. Twelve male and female volunteers, age 21-69, participated in the study. Each subject was exposed to two conditions: short-term hunger (no food for 4-6 hours) and no-hunger. Under each condition, each subject was required to curl a 10-pound dumbbell until subject experienced fatigue or weakness. EMG recordings were taken from the bicep for 2 minutes before (resting state) and after curling (fatigue state). Muscle activity was measured by the number of spikes. Overall, there was no significant difference in muscle activity between hunger and no-hunger condition. Compared to males, females showed a slight, non-significant decrease in muscle activity during hunger state, suggesting a higher muscle fatigue. Compared to younger subjects, older subjects show a decrease in muscle activity during the hunger state. Present findings suggest that short-term hunger state may accelerate muscle fatigue, with a greater impact on females and older individuals, leading to greater risks of injuries during movement. Understanding relationship between hunger state and muscle fatigue is important for prevention of injury and other risks.

### **Comparative Analysis Of Triplett Creek Watershed From 2009 To 2022**

P-28

***Josie Howard\*, Justin Korossy\*, Taylen Hylton\*, Devan Herald, . Dr. Geoffrey Gerner, mentor, Department of Biology and Chemistry, College of Science***

In 2009-2012, Morehead State University conducted an analysis of Escherichia coli counts in 36 established sampling sites in the Triplett Creek Watershed, Rowan County, Kentucky. Data collected was used to implement best management practices in an effort to improve the health and quality of the watershed, including reducing the bacterial loads. The present study is a follow-up, focusing on 12 of the sampling sites. The analyses utilized a combination of modified membrane thermotolerant Escherichia coli (mTEC) plates and the IDEXX Quanti-Tray/2000 for the detection and enumeration of the bacterial pollutant, E. coli. Data from 2022 showed that 25.0% of the sampling sites exceeded the limit of 240 E. coli per 100 mL (these sites include TC-13.52, TC-12.27, and PL-0.10), while 72.7% of the sampling sites in spring 2010 exceeded the limit for primary contact recreational use. This is a 47.7% decrease from 2010 to 2022, indicating the best management practices were successful in decreasing the impairment of identified streams. In addition, DNA was extracted from enriched bacterial cultures from water samples and analyzed by polymerase chain reaction (PCR) for the presence of antimicrobial resistance genes. One gene, *ereA* which encodes an erythromycin resistance factor, was amplified from the BB-0.23 sampling site.

## **Risky Behaviors In Central Appalachia: Teen Pregnancy And Sexually Transmitted Infections**

P-29

**Allison Hyden\***. *Dr. Lisa Shannon, mentor, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences*

According to the Robert Wood Johnson Foundation (2017), Central Appalachia had a teen birth rate 63% higher than the national rate. In the Big Sandy Region of Kentucky, the teen pregnancy rates per 1,000 females ages 15-19 were Floyd at 55.9, Johnson at 30.3, Magoffin at 57.3, Martin at 50.7, and Pike at 38.2. These were more than double the national rate (16.9) (Centers for Disease Control, 2021). Sexually transmitted infection (STI) rates within the area were also high. Chlamydia increased 200%, and syphilis increased 300% between 2011 and 2017; many of these cases were in young adults (Meehan, 2018). The Big Sandy Optimal Health Teen Pregnancy Prevention Program (TPP) is a targeted program implemented by Mountain Comprehensive Care Center, Inc. to reduce teen pregnancy STIs within the Big Sandy Region. TPP is aimed towards youth ages 10-19 with a focus on high-risk youth. The data presentation will focus on data available as of April 2022. IRB Protocol Number: 22-02-62

## **“The Never Ending Story:” Circularizing Ch. VIII In *Saccharomyces Cerevisiae***

P-30

**Chisom Iloegbunam\***. *Dr. Melissa Mefford, mentor, Department of Biology and Chemistry, College of Science*

Chromosomes are molecules of DNA that hold large quantities of genetic material in an organism. Generally in nature, eukaryotic chromosomes are linear while prokaryotic chromosomes are circular. Since they are linear, eukaryotic chromosomes possess telomeres, or repetitive nucleotide sequences, on their ends. This significant difference in structure requires different additions to the basic replication process. In prokaryotes, replication starts at a single point on the chromosome and continues until the whole chromosome has been copied. In eukaryotes, replication happens in fragments with multiple starting points. Because of this more complicated replication process, the free 3' ends of our DNA cannot be fully copied. Unchecked, this would lead to a progressive loss of important genetic information. To counteract this issue, most eukaryotic organisms express an enzyme telomerase to attach nucleotides onto the template telomere, which prevents wearing down of telomeres each time the cell gets copied. Despite the action of telomerase, we still lose telomere sequences as we age. If linear chromosomes create issues not found with circular chromosomes, this begs the question why did eukaryotic chromosomes evolve to be linear? To address this broad question, we are genetically engineering the eukaryote, *Saccharomyces cerevisiae*, with circularized chromosomes. To create yeast with a circularized chromosome, we insert DNA cassettes with selectable marker genes into the right and left arms of a chromosome. These cassettes are designed so that they can recombine and result in circularization. Recently, I have obtained circularized candidates for Chromosome VIII. Currently, I am characterizing fitness in these candidates.

**Fungi In A Warmer World: Middle Miocene Fungal Assemblages And Diversity From Alum Bluff, Florida**

P-31

***Savannah Jones\**, *Taylor Horsfall\**, *Laikin Tarlton\**, *Abigayle Caldwell*, *Liberty Smallwood\**, *Jolene Fairchild*, *Libby Lennex-Stone*, *Alyssa Patel*, *Olivia VanderEspt*. *Dr. Ingrid Romero\*\**, *Dr. Jennifer O'Keefe*, *Dr. Matthew Pound\*\**, *Dr. Noelia B. Nuñez Otaño\*\**, *Dr. Sophie Warny\*\**, *mentors*, Department of Physics, Earth Science and Space Systems Engineering, College of Science, Facultad de Ciencia y Tecnología\*\*, Universidad Autonoma de Entre Rios, Sede Diamante, CICyTTP (CONICET-UADER-Prov.ER), Laboratorio de Geología de Llanuras, Department of Geology and Geophysics\*\*, Louisiana State University, Department of Geography and Environmental Sciences\*\*, Northumbria University**

Fungi are key components of ecosystems equilibrium because of their role in different processes such as the terrestrial carbon cycle, formation of soils, and plant growth worldwide. Thus, it is crucial to understand how fungal assemblages will react to future warming scenarios. The fossil record contains information regarding how past assemblages reacted to rapid climatic shifts. The Miocene Climate Optimum (MCO) is considered the best analog for future scenarios because the concentrations of atmospheric CO<sub>2</sub> and temperatures are comparable to those predicted for the next hundred years. Looking at fossil fungal assemblages from the MCO will increase our knowledge, improving predictions about how modern fungal assemblages will react. Here, we present a study of the fungal biodiversity found in sediments deposited during the MCO (15-18 MA) from the Fort Preston Formation exposed at Alum Bluff, Florida, USA. The paleoflora and paleofauna of this formation is well known, but this is the first study of stratigraphically constrained fungal occurrences. Overall, the fungal assemblages are low diversity, in which the common groups are amero-spores and bulbil-spores. The latter suggests wet environments. This study is part of building the long-term, large-scale dataset needed to model past fungal assemblage changes and predict future fungal dynamics in response to climate change.

**Data Quality Analysis Of 200 Ge V Center Of Mass Energy P Au Collisions From Star**

P-32

***Keaghan Knight\**. *Dr. Kevin Adkins*, *mentor*, Department of Physics, Earth Science and Space Systems Engineering, College of Science**

In proton collisions, fragmentation functions describe the probability that a given parton in the initial state creates a particular hadron in the final state. Understanding fragmentation is essential for a theoretical description of measured asymmetries that provide a glimpse of the proton's spin structure. Proton-gold collisions from the STAR detector at Brookhaven National Laboratory will provide a complementary result, using reconstructed jets, to the global data which comes mostly from electron-positron annihilation experiments. A first step in extracting fragmentation functions is to perform a quality analysis (QA) of the data. In this poster we show an initial look at the data and our method for identifying and rejecting detector runs which are bad in an effort to have a clean sample for physics analysis.

## **What Majors Are Chosen By Undergraduate Students Leaving Accounting? A Review Of The Literature**

P-33

***Sarah Lager\**. Dr. Kimberly Fatten, mentor, School of Business Administration, Smith College of Business and Technology**

Undergraduate accounting retention research has focused primarily on why students choose an accounting major, but less is known about what programs students go to when they exit an accounting major. In 2006, a study which surveyed graduating accounting seniors shared that 85% of the students who choose accounting as a major had some close connection to an accountant. However, from those same students, 64.1% reported that accounting was not their first degree choice and had switched to it from a business or non-business major (Nelson, Quirin, Vendryzk and Kovar, 2008). Then, the Institute of Education Sciences published results showing declared business majors switch to a different major 31% of the time (IES, 2017). Associated research completed in a similar area published a link between a decrease in economics degree enrollment which equaled the same increase in biology enrollment. To gain insight into this subject, results from the National Survey of Student Engagement will be analyzed to determine which majors are chosen and examine other evidence to determine commonality in the data for exiting students. The results of this study will not only aid accounting program efforts to retain students, but could also help influence program structure, curriculum, and internal decisions. The results may also provide benefits to help counsel students into other programs, should they wish to leave the accounting major.

## **Predicting Cryptocurrency Price Change Direction From Supply Side Factors Via Machine Learning Methods**

P-34

***David Mayo\**. Dr. Heba Elgazzar, mentor, School of Engineering and Computer Science, Smith College of Business and Technology**

Cryptocurrency prices are highly variable. Predicting changes in cryptocurrency price is a hugely important topic to investors and researchers, with much existing research on demand-side factors. The goal of this research project is to design and implement machine learning models to predict future cryptocurrency price change direction based primarily on supply-side factors. Different unsupervised machine learning techniques are used to build the predictive models. These techniques include K Nearest Neighbors (KNN), Artificial Neural Networks (ANN), Support Vector Machines (SVM), Naïve Bayesian Classifier, and Random Forest Classifier. A dataset of 14 daily supply-side metrics for three prominent cryptocurrencies (Bitcoin, Ethereum, and Litecoin) at four different time horizons (ranging from one day to 30 days) are used to build and test the machine learning models. The outputs of these models indicate the predicted direction of the price movement over the time horizon (i.e., whether the price would go up or down), not the magnitude of the movement. Experimental results show that predictions were very unreliable for the shorter time spans but very reliable for the longest time spans. The Artificial Neural Network and Random Forest classifiers consistently outperformed the other techniques and achieved a prediction accuracy of over 90% in most models and over 95% in the best models. Experimental results show also that there is no significant difference in predictability between the three prominent cryptocurrencies.

## **Creating The First Genetically Engineered Eukaryote With Circular Chromosomes**

P-35

***Duncan McGinnis\**, Dr. Melissa Mefford, mentor, Department of Biology and Chemistry, College of Science**

Telomeres are repetitive sections of DNA at the termini of eukaryotic chromosomes that protect the ends from harm and limit how many times the cell can divide. Two of our greatest medical challenges, cancer and aging, are closely related to telomeres; most cancers upregulate telomerase, and aging human cells display shorter telomeres. To investigate the evolution and function of telomeres, we are circularizing chromosome VII in a strain of the single-celled eukaryote *Saccharomyces cerevisiae*. This circularization will remove the telomeres from the chromosome and fuse its ends together, allowing us to study how fit yeast are without linear chromosomes and telomeres. To circularize the chromosome, we created two DNA cassettes—one for the left arm and one for the right arm. Both cassettes contain a region of homology with the chromosome, a selectable marker gene, and opposite halves of the URA3 gene. The cassettes are then integrated into the chromosome distal to any functional genes. The two halves of the URA3 gene contain a region of homology, allowing recombination between the cassettes that will result in a circularized chromosome and a functional URA3 gene. We have thus far created both cassettes for chromosome VII and obtained several colonies which are candidates for double cassette integration. Currently, we are searching for colonies where recombination has occurred between the cassettes. The long-term goal of this project is to create a strain of *S. cerevisiae* with all its chromosomes circularized, allowing us to study the fitness and viability of a eukaryote without telomeres.

### **Hga Abstract**

P-36

***Wade McGuire\**, Logan Smith\*, Jane Zhang\*, Blake Orr\*, Fredre'Oni Terrado\*.  
Dr. Rachel Rogers, mentor, Craft Academy for Excellence in Science and Mathematics**

The Hazel Green Academy was an advanced secondary school in Wolfe County, Kentucky, built to service the exceptional students of the region. Unfortunately, it has been closed for nearly 40 years and almost every building has been abandoned. The only two buildings that remain in useable condition are the former school general store, now the Jot 'em Down consignment shop, and the administrative building which holds several classrooms and an auditorium. Our team has recognized the historical and regional significance of Hazel Green Academy and we have created a special project through the Craft Academy to restore and revitalize the campus. Thus far, we have gone to the Hazel Green Academy and worked on what is already in use, the Jot 'em Down and the administrative building. We have organized several service-learning opportunities for Craft Academy students to restore the campus while learning about Appalachian history, secured 5,000 dollars from Mountain Rural Telephone to assist efforts, and worked with engineers from QK4 engineering to understand the cost of renovation as well as digitally preserving the campus. We have planned to use the administration building and classrooms for their original purposes, education. The auditorium is planned to be a community space, a venue for artists to showcase their talents. For the remaining buildings on campus that have become dilapidated, we have planned to use them to house amenities inspired by their former purpose. Including, but not limited to, a community kitchen, daycare, and community garden.

## Technology In Workplace Communication By Generation

P-37

**Hannah Meadows. Dr. Christy Trent, mentor, School of Business Administration, Smith College of Business and Technology**

The purpose of this research study was to determine the generational differences in the use of communication technology in the workplace. The information collected via a self-reported survey questionnaire provided insight into the perspectives of Baby boomers, Generation X, Millennials, and Generation Z working in the education, banking, manufacturing, and retail industries. Surveys were sent to currently employed Kentucky residents. Questions in the survey examined the types and preferences of technologies used, time spent on technology, ideologies, and preferred communication methods. Though all generations used similar technologies, their perceptions and use vary widely across age groups and generations. The data collected revealed that most learned about and how to use technologies through independent practice, coworkers, and face-to-face training sessions. The top three technologies used were email, phones, and printers. While aware of the negative impact generational differences had on communication in the workplace, it was also discovered that there was resistance to learning ways to address the disparities. Unaddressed, these differences will negatively impact the communications within these organizations, making for inefficient processes and decreased productivity. The information presented will allow employers to make more thoughtful and efficient decisions regarding technology and its uses in the workplace.

## Effects of Intermodal And Intramodal Redundancy On Serial Recall Accuracy

P-38

**Reganne Miller\*, Daisy Pratt, Madison Cornelius, Johnna Brown. Dr. Gregory Corso, mentor, Department of Psychology, College of Science**

There are two redundancy principles for multimedia education design. First, the redundancy principle for visual displays – when a stimulus (e.g., number 7) and color (e.g., red) are always presented together, color is redundant, which may benefit learning (visual-visual/intramodal redundancy). Second, the redundancy effect for multimedia learning – when identical on-screen text is added to an auditory display, learning is harmed (visual-audio/intermodal redundancy). The purpose for this study was to investigate the effects of intramodal and intermodal redundancy on a working memory task. Participants (n=19) completed a serial recall task. In each trial, seven numbers were presented, and the participants recalled the numbers in order. There were ten trials per block and a total of five identical blocks. There were three conditions: intramodal redundancy (pairing color and number), intermodal redundancy (identical text and audio), and non-redundancy (black text on white background). Our first hypothesis was that intramodal redundancy would result in better performance than non-redundancy. Our second hypothesis was that intramodal redundancy would result in better performance than intermodal redundancy. Our third hypothesis was that intermodal redundancy would result in poorer performance than non-redundancy. Data analysis showed that there were no significant differences in average percent correct among the conditions, so our hypotheses were not supported. However, there was a significant block by condition interaction [ $F(12, 88) = 2.139, p = 0.022$ ] and a significant block by position interaction [ $F(24, 528) = 3.391, p < .001$ ]. Further analyses and conclusions discussed. IRB Protocol Number: 21-08-06

### **Effect Of Visual Audio Redundancy On Serial Recall Accuracy**

P-39

***Reganne Miller\*, Daisy Pratt, Madison Cornelius, Johnna Brown. Dr. Gregory Corso, mentor, Department of Psychology, College of Science***

Studies have supported the redundancy effect of multimedia learning – the addition of identical on-screen text to an audio presentation leads to poorer recall than audio alone. However, some studies argue against the effect. It is important to determine when redundancy is beneficial for learning. In the present study, participants (n=20) completed a serial recall task. In each trial, they were presented a series of seven numbers and then recalled the numbers in order. There were ten trials per block and five identical blocks. The study included three conditions, visual-only, audio-only, and visual-audio. The purpose for this study was to examine the effects of visual-audio redundancy on recall. Our first hypothesis was that recall would be better in the audio-only condition than the visual-only and visual-audio conditions. Our second hypothesis was that recall would be better in the visual-audio condition than the visual-only and audio-only conditions. Data analyses suggested that there were no significant differences in average percent correct among the three conditions. There was a significant block by condition interaction [ $F(12, 88) = 2.139, p = 0.022$ ]. It appears that the audio-only and visual-only conditions resulted in an increase in average percent correct from block-1 to block-5. However, the visual-audio condition resulted in percent correct peaking at block-3 and then decreasing, suggesting that this condition resulted in fatigue after block 3. There was also a significant block by position interaction [ $F(24, 528) = 3.391, p < .001$ ]. Further analyses and conclusions discussed. IRB Protocol Number: 21-08-06

### **Classroom Management In Kentucky**

P-40

***Sarah Miller\*. Dr. Kimberely Nettleton, mentor, Department of Early Childhood, Elementary and Special Education, Volgenau College of Education***

Classroom management is a skill many incoming teachers struggle to balance while teaching. Good classroom management aids in establishing a learning environment that encourages both social and academic learning. The cases studies recorded examine the classroom management methods of a select group of educators. These subjects described their methods of classroom management, whether self-made or research-based, through a series of interview questions. The interview questions establish an understanding of current n practice of classroom management regarding rules, procedures, positive and classroom arrangement. In evaluating different variations of classroom management, the effectiveness, and advantages and disadvantages of different classroom management methods can be determined.

IRB Protocol Number: 21-10-48

## **A Preliminary Survey On The Biodiversity Of Wasps In Eastern Kentucky**

P-41

***Lorien Molstad\**, *Zoe Baker\**, *Bethany Lucio\**, *Julia Fitzpatrick\**. *Dr. Sean O'Keefe, mentor*, Department of Biology and Chemistry, College of Science**

Biodiversity is the measure of variability of interactions between living organisms within an area. Biodiversity contributes significantly to the production of different life sustaining resources and supports a diversity of ecological life. A greater biodiverse area can help maintain environmental balance and maintain ecological diversity and health. There are multiple economic, cultural, and scientific reasons as to why biodiversity is important. When assessing biodiversity, mammals and birds are commonly used as surrogates. The problem with mammals and birds is that there are relatively few species and relatively few individuals in an area, so quantitative assessment can be difficult. However, insects are extremely diverse, ubiquitous, and important components of ecosystems, which makes them effective surrogates to assess biodiversity. Few studies have used wasps to measure biodiversity. However, wasps can be an effective surrogate to assess biodiversity as they provide essential ecological roles such as pollination, pest regulation, and general insect population control. There are both positive and negative aspects of using wasps to assess biodiversity. Advantages include wide species diversity, host specificity, and specialist roles in their environment. Downsides include few resources on wasp identification and most wasps are minute, smaller than 3 mm, which make them difficult to identify. We collected wasps from leaf litter and yellow pan traps at several localities near Morehead Kentucky. So far, we have collected several thousand specimens. Most samples contain 30-70 species of wasps. We are still sorting and identifying wasps.

## **Telomerase Activity Enhancement In *Saccharomyces Cerevisiae***

P-42

***Mackenzie Neal\**, *Hailey Rietz\**. *Dr. Melissa Mefford, mentor*, Department of Biology and Chemistry, College of Science**

Telomeres are located at the ends of eukaryotic linear chromosomes and are composed of repeated nucleotide sequences. One of their main functions is to protect chromosomal ends from being damaged. Telomeres cannot be completely copied during DNA replication so they gradually shorten during each replication cycle in what is known as the "end replication problem". To counteract this problem, the RNA-dependent enzyme complex telomerase works to extend telomeres and help protect the ends of chromosomes. Telomeres and the telomerase enzyme are heavily involved in the aging process and cancer progression. Telomeres gradually shorten with age and eventually become so short that cells begin to senesce and undergo apoptosis. Most cancers avoid senescence and apoptosis by activating telomerase at an excessive rate to reduce telomere shortening. The structure and function of telomerase RNA is not well understood. Most past research has focused on identifying loss-of-function mutations rather than identifying gain-of-function mutations. We set out to identify telomerase RNA gain-of-function mutations in the model organism *Saccharomyces cerevisiae* to help us learn more about telomere length, telomerase, and how they relate to aging and cancer. We screened nearly 10,000 colonies and identified 32 possible gain-of-function candidates that we are currently verifying. The gain-of-function mutants identified through our screen will further enhance our understanding of how significantly increasing telomerase activity could affect human health as a whole.

## 2021/2022 Craft Academy Robotics Team

P-43

***Shawn Nelson\*, Josh Day\*, Brianna Kayatin\*, Brady Sammons\*, Paul Zigo\*, Daniel Brooks\*, Logan Lee\*. Dr. Rachel Rogers, mentor, Craft Academy for Excellence in Science and Mathematics***

FIRST Robotics is a worldwide Robotics competition founded by Dean Kamen and Woody Flowers. The Craft Academy started a pioneer team (Craft coalition) to compete in the FTC (FIRST Tech Challenge) portion of FIRST Robotics. The team had three months to build an 18 by 18-inch robot that would compete on a 12 foot by 12-foot playing field. Each match consisted of a 30 second autonomous period where the team had to write pre-programmed instructions using our knowledge of JAVA and with the help of sensors to guide the robot to perform tasks and earn points. The next two minutes were a driver-controlled period where two teammates manipulated the robot through controllers to complete more intensive tasks. Each season the game board changes forcing teams to redesign their robot each year.

The team competed in two tournaments, one in Murfreesboro Tennessee, where we placed 12th out of 25 teams, and the next, three weeks later in Murray Kentucky, where the team placed 7th out of 16 teams. Our team was chosen to be a part of the final alliances in Kentucky in the semi-finals but didn't move on to the final matches. Throughout the season the team learned the engineering process, how to work with others and their ideas. and most importantly how to work quickly and efficiently as a team in a short amount of time and in stressful situations. In the Kentucky tournament, the team was the runner-up for the Connect Award and finished as a semifinalist.

## Atypical Sensory Processing And Short Term Memory In Attention Deficit Disorder

P-44

***Zachary Poling\*. Dr. Ilson White, mentor, Department of Psychology, College of Science***

Attention deficit disorders are closely linked to impaired short-term memory (STM). During development, however, abnormal sensory processing may contribute to impaired STM, likely due to dysfunctional dopamine signals in the prefrontal cortex (PFC). The purpose of this study examined the link between atypical sensory processing and prefrontal dopamine in ADHD. In addition, the link between impaired STM and PFC D1 receptors in ADHD was examined, focusing on children, age 4-16. Sensory processing was measured by a child behavior checklist, the sensory processing inventory, or sensory challenge protocol. STM function was correlated with changes in D1 receptor activation in the PFC. Results show that two modes of abnormal sensory processing -over and under responsivity- were associated with low and high levels of D1 receptor activation in the PFC, respectively. In the PFC of ADHD, impaired STM was closely associated with a decrease in D1 activation and low DA availability in the PFC. Impaired STM was improved by D1 receptor agonist, which increased dopamine signal in the PFC, suggesting potential therapeutic effects of D1 agonists in ADHD. Present findings indicate that in ADHD there is a close link between optimal sensory processing and STM function, and both functions require optimal activation of D1 receptors in the PFC. Further study is warranted.

## Accuracy And Engagement Resulting From Different Presentation Formats

P-45

***Daisy Pratt\*, Madison Cornelius\*, Reganne Miller, Johnna Brown. Dr. Gregory Corso, mentor, Department of Psychology, College of Science***

This investigation assessed accuracy and engagement resulting from different presentation formats. Participants (n=39) watched a presentation about a fake island and took an exam which covered information about the island. Three presentation formats were used, Presentation Alone, Presentation with Voice-Over, and Presentation with an Instructor. The presentation format was a between-subject variable. Each presentation used the same presentation slides. The Presentation with Voice-Over and the Presentation with an Instructor used the same audio reading the text information that was on the screen. After the presentation, the participants took an exam about the island and a survey measuring engagement. We hypothesized that the mean exam accuracy score for the Presentation Alone format would be greater than the other two presentation formats. We also hypothesized that the mean student engagement score for that Presentation Alone format would be the highest. Participants were recruited from Psychology courses for class credit. Monetary awards for exam performance were offered to the top four scorers in each condition. Analysis of exam scores resulted in significant accuracy differences,  $F(2,36) = 4.622$ ,  $p = .016$ . Post-hoc tests showed significant differences between the Presentation Alone format and the Presentation with an Instructor format. These findings are supportive of our first hypothesis. Engagement scores showed a significant interaction between the presentation format and the type of engagement ( $F(2, 36) = 3.803$ ,  $p = .032$ ). These findings suggest students are more accurate and engaged in online lectures that do not have audio and video. IRB Protocol Number: 20-09-33.

## Photography Practicum: Learning The Basics Of Managing A Fine Art Photography Darkroom

P-46

***Brooklin Routt\*, Allison Jones\*, Frazier Pack\*. Dr. Robyn Moore, mentor, School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences***

The photography practicum provides Art and Design student researchers with the practical experience of managing a fine art photography studio. Students learn how to operate, manage, and maintain industry-standard fine art archival inkjet printers as well as a fourteen-station traditional black and white darkroom. This project provides essential expertise and knowledge that students, as lab monitors, both share with other students and incorporate into their own fine art practice and professional activities. Student researchers learn how to mix, store, and dispose of photographic chemistry, provide daily assistance to undergraduate and graduate photography students, and generate ideas for improvements to the lab. Additionally, students improve their knowledge of various analog and digital photographic processes through self-directed research with the goal of helping other students learn how to further develop and understand their work. Students also contribute to the ongoing revision of the Photography Lab Manual, which specifies best practices and operating procedures for future photography lab monitors. The practical knowledge gained from this experience is highly valuable to colleges, universities, community colleges, artist co-ops, and professional photography labs that seek to employ individuals to manage and teach both digital and analog photographic practices. This research was funded with an Undergraduate Research Fellowship.

## **Aerobic Exercise And Microglia In Parkinson's And Alzheimer's Disease**

P-47

***Chyann Sargent\****, *Dr. Ilsun White, mentor*, Department of Psychology, College of Science

Overactive microglia are closely linked to accumulation of beta-amyloids, reactive oxygen species (ROS) and free radicals, leading to cell death and neurodegenerative process in Alzheimer's disease (AD) and Parkinson's disease (PD). Recent studies suggest that aerobic exercise may decrease excess ROS, thereby decreasing cell death and serving as a neuroprotective factor. Aerobic exercise may also reduce overactive microglia and decrease inflammation. In the present study, the beneficial effects of aerobic exercise on inhibition of overactive microglia in AD and PD are reviewed. Exercise effects on microglial activation and neural damage in AD and PD were compared in two conditions: exercise or no exercise. Review results indicate that aerobic exercise showed a decrease in activated microglia and decreased damage and subsequent cell death in both AD and PD patients. These results are likely due to an increase in heart rate and respiration with aerobic exercise and regulation of the amount of oxygen circulated throughout the body. Consistent with previous reports that oxygen regulation increases anti-inflammatory factors, aerobic exercise could decrease inflammation, without adding to an excess in ROS. The present study supports the notion that implementation of aerobic exercise in early stage of AD and PD patients could serve as an additional treatment option to slow the progression of neuronal damage and inflammation.

## **Exposure To Psychological Danger And Adolescent Mental Health**

P-48

***Cael Skaggs\****, *Madison Howard, Abby Chaney, Taylor Corbin. Dr. Shari Kidwell, mentor*, Department of Psychology, College of Science

Cumulative exposure to adverse childhood experiences (ACEs) have been associated with increased risk for a wide range of psychological and health difficulties (Hays-Grudo & Wilson, 2020). The ACEs approach has provided a paradigm shift in the study of and conceptualization of childhood trauma; however, ACEs are indicated as having been present regardless of circumstances. The ACE occurred or it did not. Crittenden, Landini, and Spieker (2021) propose that greater understanding of an ACE/psychological danger's impact may come from knowing the child's developmental capacity to adapt to the ACE, along with the availability of adult protection or comfort. We examined ACES/psychological danger in a sample of 21 families with teenagers (average teen age 16.6 years), specifically in relation to adolescent symptoms. Psychological danger was rated using Crittenden's 10-point danger scale, applied to events described in the adolescents' hour-long attachment interviews (TAAI: Crittenden, 2020). Symptoms were rated utilizing the Child Behavior Checklist (CBCL: Achenbach & Rescorla, 2001), which was completed by both the parent and teen. Analyses are forthcoming, but we expect that higher scores on the danger scale will be associated with greater teen internalizing (i.e., sadness/anxiety) and externalizing (i.e., defiant) behavior. This research was funded by MSU's RCPC & URF programs, as well as KY EPSCoR. IRB Protocol 15-09-11.

## Drone Mapping On Eagle Lake Dam

P-49

***Nathaniel Sparks\****. *Dr. Timothy Hare, mentor, Department of Physics, Earth Science and Space Systems Engineering, College of Science*

The Eagle Lake Dam is an important structure to campus, so making sure that it is maintaining its stability is important. Due to the position on campus a collapse would have catastrophic consequences with hundreds of tons of water being released right next to several residential buildings. The signs of danger might be subtle necessitating monitoring of the shape and structural integrity of the dam over time. In this project I used a cutting-edge technology for three-dimensional mapping of the Dam's position using an unmanned aerial vehicle (UAV), visible light camera, and photogrammetric software. I explain the process used to produce a collection of final products. I began with UAV flight instruction, aerial photography, and data collection, photo filtering, and plotting with locality data, as well as the steps taken in Pix4DMapper to generate a variety of final products. I also highlight the potential uses for different final products and showcasing their different benefits in relationship to surficial/structural monitoring.

## A Novel Colorimetric Assay Of Apurinic/Apyrimidinic (Abasic) Sites Of Deoxyribonucleic Acid (DNA) Using Bicinchoninic Acid

P-50

***Isaiah Stephens\****. *Dr. Elizabeth Thomas, mentor, Department of Biology and Chemistry, College of Science*

One cancer causing mechanism is the accumulation of apurinic/apyrimidinic (AP) sites within DNA. AP sites, also known as abasic DNA, result in the loss of a nucleobase, and are known to be caused by environmental and cancer therapeutic genotoxins. In particular, the loss of a nucleobase is caused by hydrolysis of the N-glycosyl bond, leaving an aldehyde functional group in the DNA structure. Current detection methods of AP sites require the use of expensive equipment such as high-performance liquid chromatography (HPLC) or the use of biotinylated probes like aldehyde-reactive probe (ARP) with an enzyme-linked immunosorbent assay (ELISA). Herein, describes a novel colorimetric method used to quantify AP sites in DNA that is inexpensive and easy to interpret. This assay utilizes bicinchoninic acid (BCA) to quantify AP sites through two methods of measurement: the traditional method measuring absorbances at 562 nm and recording color values (e.g., green value) of the assay using hand-held cameras. This colorimetric assay was implemented within the undergraduate organic chemistry laboratory. Students used Beer's law to generate calibration curves of known samples containing abasic DNA for both methods. Students used the calibration curves and the linear equations to predict unknown abasic DNA concentrations with up to 90% accuracy and compared both methods. This novel colorimetric assay was shown to be easily implemented into the educational laboratory environment.

### **Development Of Anti Cancer Small Molecules To Inhibit The Base Excision Repair (Ber) Pathway By Binding Apyrimidinic/Apurinic (Ap) Sites In Dna**

P-51

***Robert Tackett\*, Ellen Ledford\*. Dr. Elizabeth Thomas, mentor, Department of Biology and Chemistry, College of Science***

Cancer resistance decreases the effectiveness of currently available cancer therapies. One type of cancer resistance is the Base Excision Repair Pathway (BER). Alkoxyamines, such as TRC102 (methoxyamine), is currently being investigated in combinatorial cancer therapies to inhibit the BER pathway; thus, potentiating current cancer therapies. In particular, TRC102 binds apurinic/aprimidinic (AP) sites in DNA to indirectly inhibit the mammalian AP enzyme 1 (APE 1). APE1 is a validated drug target to effectively inhibit the BER pathway. There exists very few alkoxyamine compounds in the literature that bind the AP site within DNA. This research objective is to design and implement a viable synthetic route to prepare novel alkoxyamine derivatives that can inhibit APE1 by covalently binding AP sites within DNA. A total of three synthetic routes were evaluated. One synthetic route proved more successful than the other routes, utilizing a tert-butyloxycarbonyl protected hydroxyamine as the starting material. This synthetic route provided the characterized final product, alkoxy amine O-(2-benzyl)hydroxylamine hydrochloride in 29.7% yield. Although this is a low yield, this is a viable synthetic route that will be optimized in future studies. In addition, this synthetic route will offer a method to synthesize and evaluate other alkoxyamine derivatives to establish a structure activity relationship.

### **Quality Improvement Of Medication Errors**

P-52

***Mary Thornburg\*, Gracie Smith\*, Connor Noble\*, Breanna Markwell\*, Sarah Rigsby\*. Dr. Mary White, mentor, Department of Nursing, College of Science***

During a clinical rotation at a large urban teaching hospital, the occurrence of medication errors noted resulted in negative impacts on patient wellness. Research studies indicate that the U.S. spends more than \$40 billion each year as a result of medication errors. A large portion of these medication errors are preventable. A thorough literature review of 40 research studies was conducted to identify issues associated with medication errors. This quality improvement project aims to identify the prevalence of medication errors, their effect on patient wellness, its monetary effects in healthcare, and what preventative interventions can be implemented to prevent such errors.

## **KYHTL At OPaL: Developing Skills In Melissopalynology In Support Of Regional Beekeepers**

P-53

***Muriel Tipton\*, Dr. Jen O'Keefe, Dr. Ingrid Romero, mentors, Department of Physics, Earth Science and Space Systems Engineering, College of Science***

Bees are one of the most integral organisms in the world because they are key in the process of pollination, especially for plants that are used in human consumption. However, climate change is dramatically affecting this process by altering the bloom time of the plants while also changing the foraging and pollination processes of the bees. The Kentucky Honey Testing Laboratory (KYHTL) was established at Bluegrass Community and Technical College (BCTCS) in fall 2019. KYHTL's goals are utilize both melissopalynology (optical identification of pollen grains) and DNA metabarcoding to facilitate the identification of pollen types and quantify the amount of these pollen in regional honeys, a process called honey typing. Honey typing permits producers to label their honey according to the major plant group nectar it contains. In the O'Keefe Paleocology Lab (OPaL), we utilize melissopalynology to identify the pollen in samples of honey from all over the state and world in order to provide a guide for more efficient database searches during DNA metabarcoding performed by the KYHTL lead lab at BCTCS. Here, we present our results to date and an overview of the melissopalynology learning curve and typing process.

## **Caspr Solar Car Project**

P-54

***Kaleb Trent\*, Hayley Milner\*, Bryce Watkins\*, Andrew Dorn\*. Dr. Joyce Stubbs, Dr. Steve Stubbs, mentors, Craft Academy for Excellence in Science and Mathematics***

The Solar Car Challenge hosts a nationwide competition where students design and build a car powered by solar panels, and then race at either Texas Motor Speedway or in a cross-country race. There are five divisions, each with its own rules and regulations. The way that you win is by completing the highest number of laps in the shortest amount of time. The Craft Academy Solar Powered Racing (CASPR) will be attempting to compete in the classic division at the Texas Motor Speedway in July. This poster will provide the basic knowledge of the Solar Car Challenge which includes: the rules of the competition, the history and basis of the solar car challenge, and the design process that a solar car team goes through when making a solar car. In this poster the affects of Covid-19 on the design process will be discussed. Also, this poster will go over the design process that the team has been following, the current stage of design, and the future of design. All the challenges that have been faced by the CASPR team will be discussed, along with how those challenges were overcome.

### **Quantifying Ant Communities To Measure Ant Biodiversity Near Morehead**

P-55

*Alyssa Turner\*, Jude Hall\*, Tayla Lee\*. Dr. Charles Lydeard, Dr. Sean O'Keefe, mentors, Department of Biology and Chemistry, College of Science*

To effectively conduct conservation efforts, we can use biodiversity to assess the condition of our environment. Biodiversity has been commonly defined as the variety and variability among living organisms within an area. When our ecosystems are at their best, they clean water, purify air, maintain soil, regulate climate, recycle nutrients, and provide food. Everything within an ecosystem is interdependent, so biodiversity is an important factor and indicator of environmental health. Indicators help us to measure and monitor pressures or threats in land and water use, habitat loss, the conditions of ecosystems, the conservation response, and the economic benefits to people. Many different organisms have been used to assess biodiversity, such as plants, mammals, birds, butterflies, beetles, etc. Ants are a great candidate for biodiversity research, as they are found in many types of habitats, are diverse, extremely numerous, fulfill a variety of ecological roles, are sensitive to environmental change, and are conveniently easy to collect. Our most used method of collection is sorting through leaf litter. We collected leaf litter from three sites in Rowan County: Eagle Lake, Stony Cove, and Rodburn Hollow. We used Berlese funnels to extract the specimens from the litter, organized, identified, and counted them in order to analyze the biodiversity. Over the past three years we have collected almost 7,000 ants, including 18 genera. We plan to use the Shannon and Simpson indices to better evaluate alpha and beta diversity among our three study sites using ants.

### **College Students Knowledge And Use Of Herbal Supplements: Informed Decision, Health Risk, Or Marketing Ploy?**

P-56

*Jillian Wallshield. Dr. Wilson Gonzalez-Espada, mentor, Craft Academy for Excellence in Science and Mathematics*

Herbal supplements (HS) are products made with plants, herbs, or botanical substances perceived to help treat a disease or stay healthy. Despite weak scientific evidence of effectiveness, and the fact that HS are not intended to diagnose, treat, cure or prevent any disease or condition, they are heavily marketed and are readily available in pharmacies, retail stores, and online. The purpose of this study was to understand HS use among college students in Eastern Kentucky, particularly in the context of independent variables like gender, physical activity, diet, health, and attitude toward science. This area of research has been recognized by the National Institute of Health and the National Center for Complementary and Integrative Health as a priority.

Of those participants who reported using HS, the median number was 4.5. Preliminary data suggested that participants found out about HS through sources susceptible to mis- and dis-information, including the internet or friends, and seldom through a licensed physician. Surprisingly, several participants used HS to treat medical conditions, like urinary tract infections, depression, migraines, and more. The inferential statistical analyses did not uncover strong associations between HS use and the independent variables.

## **Minority Students At A Predominately White Institution**

P-57

***William Wellman. Dr. Steve Chen, mentor, School of Business Administration, Smith College of Business and Technology***

This study examined mainly African-American and minority students' learning experience at a regional public university in Appalachia to improve the existing academic support services and create a safe, diverse learning environment for racial minority students. This study examined over 150 students at Morehead State University. Each student was given a survey analyzing 7 demographic items, 6 activity items, and 22 Likert-scale items. There was also a subsection dedicated strictly to student-athletes to examine the stereotypes they face as well. Participants were randomly solicited in an online form as well as paper copies given in hallways, classrooms, and the library. In general, the results showed the need for addressing the diversity and inclusion on campus. Strategies for improving existing services and ways for fostering an inclusive campus environment were discussed.

## **Telehealth As Preventative And Quality Control Measure For Hospital Readmissions And Comprehensive Health Factors: A Quality Improvement Project**

P-58

***Madison Whitenack\*, Randa Thompson\*, Elizabeth Williams\*, Kaitlyn Workman\*, Miracle Thacker\*. Dr. Mary White, mentor, Department of Nursing, College of Science***

Hospital readmission rates are a consistent problem within the healthcare field. A 2018 study found that the 30-day readmission rate was 14% and almost four million adults had a 30-day hospital readmission (Weiss et al., 2021). The effect of hospital readmission rates on individual's health is supplemented by the effect of overall cost of healthcare; over \$40 billion is spent on readmissions and majority of avoidable readmissions is paid for by employers and taxpayers (OrthoLive, 2019). Comprehensive health factors, such as medication compliance, recognizing early symptoms to major health issues, preventing falls due to preventable measures, ability to make follow up appointments, complying with health advocacy measures such as diet and exercise, and proper home health skills such as tracheostomy care and insulin administration all impact hospital readmissions. Telehealth use has seen a drastic increase due to the recent pandemic; the impact Telehealth has on the previously listed health factors has the potential to reduce costs of healthcare, improve overall health for individuals, and reduce hospital readmission rates. This project reviews 40 studies regarding Telehealth on hospital readmission rates and overall health and associated costs. The purpose of this quality improvement project is to use evidence-based research and practices to educate and provide guidelines for staff nurses on effects of Telehealth and reducing readmission rates.

## Is Dismissing Parenting Associated With Avoidant Adolescent Coping?

P-59

***Madison Whitenack\*, Lauren Houser, Drew Litteral, Lauren Wright, Kathryn Gallenstein. Dr. Shari Kidwell, mentor, Department of Psychology, College of Science***

In recent years, greater attention has been paid towards teaching individuals to be mindful and accepting of negative emotions rather than pushing them away. Gottman, Fainsilber, & Katz (1997) described parents as emotion coaching if they treat the child's feelings as important and an opportunity to teach about feelings. Emotion coaching has been associated with children having less anxiety, less anger, better social skills, and higher self-esteem. The present study hypothesizes that parent's attitudes and behaviors towards their teen's feelings will be correlated with their teen's own acceptance and comfort with feelings. Specifically, in our study of 21 families, parents and teens completed complementary, standardized interviews about sadness and anger. The teen interviews were coded on 5-point scales for indicators of accepting attitudes towards these emotions, and were also coded for type of coping strategy most often employed for dealing with sadness and anger. Separate scores were derived for each emotion. The parent interviews were coded using a 10-point dismissing scale, with disapproving parents receiving the highest ratings. Analyses are ongoing, but we believe that parents who are more dismissing towards their adolescent's anger and sadness will tend to have teens who use avoidant coping strategies. For example, such teens will more often say they isolate themselves or suppress these feelings. If supported, this has important implications for the adolescents' psychological well-being. This research was funded by MSU's RCPC & URF programs, as well as KY EPSoR. IRB Protocol 15-09-11.

## **Boogaloo Bois**

P-60

***Daniel Wohlfarth\*, Michael Bogucki\*. Dr. Elizabeth Perkins, Mr. Clay LaBreche, mentors, School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences***

"The Boogaloo Bois." Classified as a domestic extremist group, earned the attention of researchers in 2019, when they began to notice the term "boogaloo" was being used to refer to a coming civil war or adjacent apocalyptic event. The group continued to grow in the following year. As the group grew in prominence, so did its media presence. This presence; however, was often conflicting. One media source would describe the Boogaloo Bois as aligning with white power groups, while another media source would describe the Boogaloo Bois as standing with Black Lives Matter. Given that the Boogaloo Bois have participated in political violence, mainly attacking police officers, it is necessary to resolve these media discrepancies into a convergent model of the group which can be used to forecast future violent actions. We gathered information about the Boogaloo Bois from several sources: the news media, social media posts, and a confidential source who had access to several encrypted chats used by the group. Information was used to describe the group's political ideology and outlook, racial beliefs, police support, and general group characteristics. These descriptions were used to define a bounded rationality common to all members. This bounded rationality was then used to augment rational choice theory to predict which events could spur the group to violence. Other criminogenic theories; such as general strain theory, were used for analysis. IRB # 20-12-44

## 2021 - 2022

### Recipients of Undergraduate Research Fellowships

Morehead State University supports the initiative for students to engage in research, scholarship, performance activities and creative works. Listed below are the 2021-2022 awardees and their mentors.

#### CAUDILL COLLEGE OF ARTS, HUMANITIES AND SOCIAL SCIENCES

<b>Student URF</b>	<b>Class</b>	<b>Department</b>	<b>Mentor(s)</b>
Allison Hyden*	SR	SHSS	Lisa Shannon
Brooklin Routt*	SR	SCCA	Robyn Moore
Gracie Davis*	SR	SHSS	Laken Albrink
Lindsey Stidam *	SO	SHSS	Laken Albrink
Hayley King*	JR	SECL	Philip Krummrich
Holly Hendrix*	SO	SECL	Philip Krummrich
Kaytlyn Hicks*	SR	SECL	Alison Hruby
Matthew Grace*	SO	SHSS	Alana Scott
Nathaniel Bratzke*	SR	SHSS	Thomas Kiffmeyer
Olivia Dale*	SR	SHSS	James Masterson
Sydney Moore*	SR	SECL	Alison Hruby
Taylor Burnette*	SR	SCCA	Joy Gritton

#### COLLEGE OF SCIENCE

<b>Student URF</b>	<b>Class</b>	<b>Department</b>	<b>Mentor(s)</b>
Cael Skaggs*	JR	PSY	Shari Kidwell
Griffin Newell*	SR	PSY	Shari Kidwell
Alina-Sophie Koch*	JR	BIOL/CHEM	Mark Blankenbuehler
Ashley Peters*	JR	MATH	Joshua Qualls
Mercy Hailu*	JR	BIOL/CHEM	Sean O'Keefe
Mary Thornburg*	JR	NURS	Mary White
Noah Blevins *	JR	NURS	Mary White
Calista Dean*	SR	BIOL/CHEM	Emma Schmittzehe
Chisom Iloegbunam*	SR	BIOL/CHEM	Melissa Mefford
Kayla Blain*	SR	NURS	Mary White
Johnna Brown*	JR	PSY	Gregory Corso
Reganne Miller*	SR	PSY	Gregory Corso
Justin Korossy*	JR	BIOL/CHEM	Geoffrey Gearner
Taylen Hylton*	JR	BIOL/CHEM	Geoffrey Gearner
Madison Whitenack*	JR	PSY	Shari Kidwell
Eliana Eldridge *	JR	BIOL/CHEM	Sean O'Keefe
Madison Whitenack*	JR	NURS	Mary White
Robert Tackett*	JR	BIOL/CHEM	Elizabeth Thomas
Mackenzie Neal*	JR	BIOL/CHEM	Melissa Mefford
Hannah Clatos	SR	AGR	Vijay Subramaniam
Harrison French*	SR	MATH	Russell May
Isaiah Stephens*	SR	BIOL/CHEM	Elizabeth Thomas

Keaghan Knight*	SR	PHES	Kevin Adkins
Mollee Flannigan*	JR	BIOL/CHEM	Eric Rouchka
			Janelle Hare
			Xiaohong Li
Nathaniel Sparks*	SR	PHES	Antonia Bottoms
			Charlie Mason
			Jen O'Keefe
Nathaniel Sparks*	SR	PHES	Timothy Hare
Noah Cooley*	JR	MATH	Michael Dobranski
Richie Knupp*	JR	MATH	Joshua Qualls
Salem Wolsing*	FR	PHES	Dirk Grupe
Tim Wright*	JR	PHES	Thomas Pannuti

#### SMITH COLLEGE OF BUSINESS AND TECHNOLOGY

Student URF	Class	Department	Mentor(s)
Dalton Hensley*	SO	SECS	Heba Elgazzar
Hannah Meadows	SR	SBA	Christy Trent
Jon Jenkins*	JR	SECS	Sherif Rashad
Sarah Lager*	JR	SBA	Kimberly Fatten
Suhana Ambol*	SR	SECS	Sherif Rashad
William Wellman	JR	SBA	Steve Chen

#### VOLGENAU COLLEGE OF EDUCATION

Student URF	Class	Department	Mentor(s)
Brooke Boggs*	SO	ECESE	Timothy Simpson
Reagan Massie*	SO	FGSE	Jeannie Justice
Sarah Miller*	FR	ECESE	Kimberely Nettleton
Victoria Kinney*	SR	ECESE	Rebecca Roach

*\*presenting at the 2022 Celebration of Student Scholarship*

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