1:30 - 2:30 p.m. **Accent Position And Attachment Across Clauses**

CS-1

***Elizabeth Keeton, Kelsey Ball*, Victoria Nash*. Dr. Katy Carlson, mentor,* School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

In this project, we manipulated accent position in ambiguous sentences such as "Alex told Tim that Suzanne tripped Henry last Saturday night." The final phrase ("last Saturday night") can attach to and modify either of the verbs in the sentence ("told" or "tripped"), resulting in high attachment ("Alex told Tim something last Saturday night") or low attachment ("Suzanne tripped Henry last Saturday night") meanings. In previous studies on related sentences, we have found that accenting either verb affects attachment by drawing the ambiguous phrase to this focused, important information. Additionally, a prosodic boundary (a brief pause) before the final phrase increases high attachment.

In this study, we will further investigate this idea through an auditory comprehension experiment that features statements with a constant prosodic boundary and changing accent position. In three conditions, either the subject ("ALEX told Tim…"), the verb ("Alex TOLD Tim…"), or the object of the verb ("Alex told TIM…") was accented. The other three conditions have the same constituents within the lower clause accented ("Suzanne," "tripped," or "Henry"). We predict that the accented first verb should lead to more high attachment than the accented second verb, and that accenting subjects will not affect attachment, based on previous findings. But in this experiment, we particularly want to know whether or not object accents affect attachment preferences. If the object accent conditions produce similar results to verb accent conditions, we will know that accenting an object can focus a whole verb phrase and therefore attract attachment. However, if the object accent cases resemble the subject accent cases, we can conclude that an accent must be placed on the head of a phrase to attract attachment.

This research was partially supported by NICHD R15HD072713 and NIGMS P20GM103436 grants.

12:15 - 1:15 p.m. **An Overview Of The Qualified Immunity Doctrine And Its Application In Kentucky Law**

CS-2

Ethan Garvin. Mr. Joe Dunman, mentor, **School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

Qualified immunity is a legal doctrine that protects law enforcement officers from lawsuits if the courts find their actions fit three criteria: the action must be discretionary rather than ministerial, the action must be in good faith, and the action must be within the scope of the employee's authority. By conducting a survey of cases in both the Kentucky court system and the federal court system, this presentation analyzes how qualified immunity is applied. This presentation looks at the doctrine and what the courts look for in various tort claims involving police officers, such as negligence, assault, and false imprisonment.
It also discusses the significant pitfalls with the qualified immunity doctrine and how it can shield law enforcement officials from being held liable in a civil case. A plaintiff seeking damages in tort cases must prove that it is more likely than not that the defendant is liable for whatever tort is being alleged. They do this by showing the defendant's conduct fulfilled certain elements, and if they do so, then they win. A result of the qualified immunity doctrine is that even if a plaintiff proves each element in a case with a police officer, the law enforcement official can avoid being held liable.

12:15 - 1:15 p.m. **Faith And Crown: Simone Martini's Altar Of Saint Louis Of Toulouse As Material And Social Contract**

CS-3

Sophie Pruitt*. Dr. Julia Finch, mentor, **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

Altarpieces are devotional objects, and in some cases they can be politicized. The Altar of St. Louis of Toulouse by Simone Martini acts as the base of a social contract between a king who was second in line to the throne, his brother-saint, recently canonized, and the people of Naples who were persuaded to accept both as truth. In The Social Contract, Rousseau argues that laws are binding only when they are supported by the general will of the people. The miraculous imagery on the altarpiece proposes the alignment of King Robert's rule with that of the church, and also to popular piety in the worship of saints. The social contract put forth in the materiality of the altarpiece allows it to be the pedestal on which the argument for the rule of Robert of Anjou, and the success of the St. Louis cultus stands. While the conceptual framework of the social contract was still nearly half a century away, we can apply the concept to better understand the way materiality and agency affect the agreements between the people and the ruler. The altarpiece can be seen as a cementing factor between groups of powerful political players in Robert's court, and the vassals they ruled over. The commission of this altarpiece strengthens the rule of Robert of Anjou, reinforces the political process of succession, and creates opportunity for Robert to expand on his birthright identity as Louis' brother.

1:30 - 2:30 p.m. **Oboe Reed Adjustment: Suggestions For Beginning Reed Makers**

CS–4

Kristen Daniel*. Dr. Thomas Pappas, mentor, **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

It is crucial that every oboist understand oboe reeds well enough to be able to make adjustments when needed. Kristen will conduct experiments on her own reeds and reference prominent literature from the field of reed making. The ultimate aim of this research project is to create a troubleshooting flowchart for beginning reed makers to reference while adjusting reeds to meet their personal needs and preferences.

1:30 - 2:30 p.m. **Prosody And Attachment In Possessive Structures**

CS–5

Elizabeth Keeton*. Dr. Katy Carlson, mentor, **School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

In this project, we are studying the effect that prosodic boundaries and accent location have on attachment in an ambiguous phrase like “the daughter of the pharaoh’s advisor.” Under high possessive attachment, the phrase could mean, “There’s a daughter of the pharaoh, and we’re talking about her advisor.” If there is low possessive attachment instead, the phrase could be understood as, “There’s a pharaoh’s advisor, and we’re talking about his/her daughter.”

In an auditory questionnaire, participants will listen to 24 dialogues, with the phrases preceded by the question “Who was it?” We placed contrastive accents on the first noun (“the DAUGHTER”), the second noun (“the PHARAOH’s”), or neither noun. Within each accent pattern, there were versions with and without a prosodic boundary (a brief pause after “pharaoh’s”), which resulted in six total conditions. Participants will be asked to choose between two paraphrases of the phrases (a forced-choice task) after hearing each dialogue.

We predict that the prosodic boundary will increase the likelihood of participants choosing the high possessive rather than the low possessive attachment, following previous research. If an accent on the first noun also increases high attachment, then this finding would support the Focus Attraction Hypothesis, on which an ambiguous modifier is drawn to the most important information in a phrase or sentence. On the other hand, if accent position does not affect attachment, we will conclude that this possessive structure differs syntactically from ones in which we have shown that accents attract attachment.

This research was partially supported by NICHD R15HD072713 and NIGMS P20GM103436 grants.

1:30 - 2:30 p.m. **The Effective Use Of Internet Resources For Language Learning**

CS–6

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

Our project is to assist language learners by taking advantage of the multitude of Internet resources to determine the most helpful sites as well as the most effective methods to improve according to the learner's goal. Goals can include wanting to retain fluency after not studying a language for a long period, learning a new language from square one, improving spoken language after focusing on writing in the classroom setting, among others. We devised general plans with activities that correspond to varying levels of language experience and goals. To test out our ideas, we made customized language learning plans based on the original plans for 12 volunteers according to their needs as determined by a survey.
Overall, we seek to identify the best and, ideally, free resources available so that the learners can focus their time and energy on studying the language over struggling to find what suits their needs best. Furthermore, we are identifying the best strategies so that the learners get the most out of their investment in a foreign language.
We encourage anyone who wants to relearn, build on, or start learning a language to test out our models and let us know how well they work!

12:15 - 1:15 p.m. **The Glamor Fades Away: Fictional Spies Vs. Real Life Intelligence Agents**

CS–7

Victoria Nash*. Dr. Sylvia Henneberg, mentor, **School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

Spies have been featured in fiction for centuries. As the spy fiction genre developed and spying became one of the principal national preoccupations in many countries during the Cold War, spy narratives increased in popularity and were successfully adapted for film. Perhaps the most notable spy films come from Ian Fleming's James Bond franchise. This study uses the James Bond and Jason Bourne film franchises as models of fictional spy portrayals. The project evaluates the representations of spying in fictional writing and film, comparing these to the actual traits, tasks, and lives of real-life spies. Real-life spies live dramatically different lives from fictional spies. The study cites evidence from interviews with real-life spies and features a case study of a female spy who rose through the ranks of the CIA during the height of the Cold War. This information will provide useful context for students of literature and film as the nature, parameters, and substance of historical intelligence work throw into stark relief the artistic imagination, devices, conventions, and vocabulary applied in fictional approaches to spying.

12:15 - 1:15 p.m. **United We Stand Divided We Fall**

CS–8

Nicholas Deem*. Dr. Douglas Mock, mentor, **School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

In modern times we have come to a point where many people have considered the United States a declining state. Many scholars, offering their reason as to why this is happening, ranging from not being involved enough in foreign affairs to our growing national debt. There are many reasons why this might be happening. There has been a massive problem that has plagued the United States well before the start of the 21st century. The Major Political Divide (MPD). The MPD or sometimes known as party politics or Hyper Partisanship has been a problem for many countries, with each one declining as a result. Russia during the early 1900s had grown so far apart that it triggered a civil war. After the revolution, Russia was not seen as a great power again until WWII. Most of Chinese history has been nothing but political disputes leading to war among each other, the most recent being that of Mao Zedong's Communists against the Nationalists. The political divide in Germany during the 1930s ultimately leads to the rise of Hitler and the Nazi party. With countless examples of how political divisiveness can lead to a country's decline. In Modern-day America, we can see the same divide among the political parties today. Looking mainly at the United States, we can use other country's history and compare that to modern America and why we have been declining far longer than what most people think.

11:00 a.m. - 12:00 p.m. **"We (Don't) Talk About It": Parent's Dismissing Strategies And Teen's Discomfort With Sadness And Anger**

CS–9

Hannah Daniels, Kathryn Gallenstein*, Lauren Wright*. 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 treated 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 (mean age 16, 9 female) completed complementary, standardized interviews about sadness and anger. The teen interviews were coded for indicators of accepting and adaptive attitudes towards these emotions, using a series of 5-point scales. Separate total scores were derived for sadness and anger. The parent interviews are currently being coded. These are assigned a classification of being coaching, dismissing, or disapproving, as well as rated with a 10-point scale reflecting the degree of disapproval of how their teen expressed the emotion. With nearly half of the sample's parent interviews coded, the vast majority of parents have been classified as dismissing. If this pattern holds with all coding completed by presentation time, this will have implications for how their adolescents deal with feelings, both on our interview and in life in general.

4:00 - 5:00 p.m. **A Deep X Ray Survey Of The Nearby Galaxy Ngc 7793 With The Chandra X Ray Observatory**

CS-10

John Fitzpatrick*. Dr. Thomas Pannuti, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

We present an analysis of the discrete X-ray source population of the nearby face-on spiral galaxy NGC 7793 as revealed by the Chandra X-ray Observatory. With its exceptional angular resolution of 1 arcsecond and its moderate flux sensitivity, Chandra is invaluable for the detection of discrete sources in nearby galaxies (such as X-ray binaries, supernova remnants and central supermassive black holes) and for establishing firm positional associations with sources detected at other wavelengths. With its face-on orientation and high Galactic latitude (which result in minimal internal and Galactic absorption, respectively), high star formation activity, and extensive complementary observations at other wavelengths and accompanying analysis, NGC 7793 is an excellent target for the study of a population of discrete X-ray sources in a normal spiral galaxy. The total effective exposure time of the observations of this galaxy is 2.2 x 10^5 seconds (a factor of 4.5 greater than the previous study presented by Pannuti et al. 2011) and the limiting luminosity attained by this observation is 7 x 10^35 ergs/s. Using the wavelet-based source detection tool "wavdetect," we have identified a total of approximately 46 discrete X-ray sources in this galaxy (an improvement compared to 22 previously known). There were 11 X-ray counterparts to optically-identified SNRs, 12 X-ray counterparts to discrete radio sources, and six instances where X-ray sources were detected for optically-identified SNRs that also possessed radio counterparts. Finally, within the individual observations, we have identified five sources which exhibit variability during an individual observation.

4:00 - 5:00 p.m. **A Multi Wavelength Study Of Pks2135 147**

CS-11

Parker Poulos*. Dr. Dirk Grupe, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

I present a multi-wavelength study of the radio-loud quasar PKS2135-147, a variable source in X-ray and UV emission. First identified in 1966, this source is variable on the scale of months to years. X-ray and UV data from Swift are primarily used in this study, and this source has been observed by Swift since 2013. It can be seen that the variable emission from this source is primarily due to accretion rate fluctuations, though there are also contributions from the jet.

11:00 a.m. - 12:00 p.m. **An Exploration In The Tools Of Options Pricing**

CS-12

Ryan Hinson*. Dr. Chris Schroeder, mentor, **Department of Mathematics, College of Science**

Stock options can be a useful tool in any investor's portfolio. They allow the skilled investor to increase their leverage and possibility for a higher payout with less risk. However, they are only beneficial if the investor knows how to use them, and if they accurately reflect the price of the option. This presentation hopes to offer some insight into the binomial method of options pricing along with new adjustments to the model in hopes of reflecting a more accurate options price. This, along with the Monte Carlo simulation presented, will hopefully offer some insight into the mathematical investor's toolbox.

4:00 - 5:00 p.m. **Analysis Of The Changing Look Agn Ngc 1566**

CS-13

Rebecca Mikula*. Dr. Dirk Grupe, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

The Seyfert Galaxy NGC 1566 was detected in an X-ray outburst by INTEGRAL in June 2018 and triggered several observatories with follow-up observations including the Neil-Gehrels Swift Observatory. This source saw a second, smaller flare in the summer of 2019. I will report on the long and short term X-ray and UV/Optical light curves and how we can explain this outburst by an accretion disk instability. I will also discuss some spectroscopic modeling done with Cloudy. Interestingly, optically NGC 1566 is a 'changing look' AGN which changes its optical spectroscopic classification from a Seyfert 1.5 type to a Seyfert 1. High-resolution X-ray spectroscopy also suggests the presence of outflowing gas with velocities of 500 km/s.

2:45 - 3:45 p.m. **Are Telomeres Required? Genetically Engineering A Eukaryote With Circular Chromosomes**

CS-14

Nadia Richardson*. Dr. Melissa Mefford, mentor, **Department of Biology and Chemistry, College of Science**

Telomeres are regions of repetitive DNA at the ends of linear eukaryotic chromosomes. While telomeres play important roles in protecting the ends of chromosomes, they cannot be fully copied by the DNA replication machinery. To overcome this end-replication problem, an enzyme called telomerase adds sequences to the 3' end of the chromosome. Without telomerase activity, telomere lengths decrease and may be a leading cause of aging; while up-regulation of telomerase activity is implicated in >85% of cancers. Interestingly, prokaryotes have circular chromosomes that lack telomeres and these organisms have no need for telomerase. So, why did linear chromosomes, and thus the need for telomeres and telomerase, evolve? To begin to address this broad question, I am genetically engineering a circularized version of Chromosome XVI in the yeast Saccharomyces cerevisiae. Our method involves inserting DNA cassettes containing selectable markers at the ends of both arms of Chromosome XVI. The selectable markers contain homologous sections, so that once the cassettes have been integrated into both arms we can select for a recombination event between the cassettes to cause circularization. Thus far, I have successfully confirmed integration of the left arm cassette in several candidates and have potential double integration candidates. In an effort to increase the efficiency of the integration of DNA cassettes in Chromosome XVI, we are designing new CRISPR gRNAs to targere double strand breaks in the desired location. Once yeast with a circular chromosome XVI are confirmed, we will assess their relative fitness. Our experimental approach will ultimatley shed light on the evolution of linear chromosomes in eukaryotes.

2:45 - 3:45 p.m. **Circularized Chromosomes In The Eukaryotic Yeast Saccharomyces Cerevisiae**

CS-15

Blake Hoover*. Dr. Melissa Mefford, mentor, **Department of Biology and Chemistry, College of Science**

When eukaryotes first evolved, a transition occurred from circular chromosomes to linear chromosomes. The ends of chromosome have protective caps comprised of DNA repeats called telomeres. Telomeres play key roles in two of the biggest problems in modern medicine: aging and cancer. As individuals age, telomeres shorten due to an inability to fully copy the chromosome ends during replication. In cancer, on the other hand, the enzyme telomerase is upregulated to maintain telomere length and allow the unending cellular proliferation characteristic of this disease. The goal of our work is to explore the evolution of chromosomes and unravel the roles telomeres and telomerase play in medical applications . Specifically, we are trying to circularize the linear chromosomes in the single-celled, eukaryotic yeast Saccharomyces cerevisiae. Our genetic engineering strategies involve building DNA cassettes, inserting them into the left and right arms of a single chromosome, then allowing a recombination event to connect the ends. In the left arm, we are inserting a cassette holding the HIS3 gene and half of the URA3 gene. In the right arm, we are inserting the LEU2 and the other half of the URA3 gene . By doing so, we can test independently for the integration of both cassettes for their respective arms by growing cells on plates only fit for the ones with the additional full gene inserted. After confirming both cassettes are inserted, we can then attempt to circularize the chromosomes by homologous recombination since both cassettes contain a region of DNA overlap. As of today, I have confirmed integration of AB and CD cassettes into their respective arms and am now transitioning to the final step of circularization. Ultimately, our goal is for the product of this genetic engineering process to shed light on the evolution of linear chromosomes and how eukaryotes benefit from their selection over circular chromosomes.

11:00 a.m. - 12:00 p.m. **Effects Of Online Presentation Format On Student Stress**

CS-16

***Jessica Hamm, Leah Hayes, Makayla Reynolds*, RaeAnna Whitaker*, Reganne Miller. Dr. Gregory Corso, mentor,* Department of Psychology, College of Science**

The number of online courses has increased in recent years which calls into question the presentation format of online learning that is most beneficial for students. The purpose for this study was to measure stress levels as a function of different asynchronous online presentation formats: slides only, slides with audio of a male instructor and slides with video and audio of the same instructor. Temperature, oxygen levels, GSR, blood pressure, heart rate were measured because prior studies have indicated a relation between stress and these physiological variables. Participants (N=27) were randomly assigned to one of three formats. Each format presented information about a fictitious island. Participants were administered a personality assessment, stress survey, and pre-exam. These were followed by the presentation about the island. At the end of the presentation questions about the island were asked (post-exam). The physiological measures were taken after the pre-exam, after the presentation, and after the post-exam. We hypothesized that stress levels would fluctuate throughout the course of the session with peak stress levels occurring prior to the post-exam. Repeated measures ANOVAs revealed no significant effects of the presentation formats on the physiological stress measures (p>. 05). We also predicted that the highest stress levels would be achieved during the slides-only format condition. The results did not support this hypothesis either (p>.05). These non-significant results could be because of low power. Overall, the results suggest that the type of presentation format used for asynchronous learning does not have a significant impact on student stress

11:00 a.m. - 12:00 p.m. **Experiential Avoidance And Fear Of Intimacy In Social Interactions And Loneliness**

CS-17

***Jacob Lewis*. Dr. Daniel Maitland, mentor,* Department of Psychology, College of Science**

Loneliness has become such a problem in the United States, that even before the COVID-19 pandemic, the USA's surgeon general had warned of the epidemic of loneliness (Murthy, 2016). Even when accounting for other health behaviors, loneliness increases the likelihood of early death by 26% (Holt-Lunstad et al., 2015). Previous research indicates that experiential avoidance and fear of intimacy are associated with loneliness and resulting psychological distress. However, little is known about how these variables impact daily social interactions and the resulting impact on loneliness and psychological well-being. This experiencing sampling study examined the extent to which social interactions were influenced by experiential avoidance and fear of intimacy, and how individuals evaluated their loneliness and well being as a function of those interactions. Participants completed 14 days of surveys that were delivered three times a day related to variables in this study and specific aspects of their social interactions. The discussion will focus on how the current study can inform understanding the development and treatment of loneliness.

11:00 a.m. - 12:00 p.m. **How Fear Of Intimacy Impacts Our Sex Life: A Quasi Experimental Design**

CS-18

Kayla Daulton*. Dr. Daniel Maitland, mentor, **Department of Psychology, College of Science**

The relationship between sexual satisfaction and interpersonal intimacy is relatively well established (Freihart et al., 2020). However, little is known about how deficits in intimacy may impact maladaptive such as problematic pornography consumption or sexual compulsivity. Previous research has indicated that experiential avoidance, a conceptual precursor to a fear of intimacy (Maitland, 2020), predicts some of these problematic behaviors (Levin et al., 2019). Similarly, loneliness, thought to partially result from loneliness, is predictive of pornography use (Butler et al., 2018) and sexual compulsivity (Chaney & Burns-Wortham, 2015). The current study sought to investigate the role of fear of intimacy in sexual satisfaction, problematic pornography consumption, and sexual compulsivity. It's hypothesized that those who experience higher fear of loneliness are more likely to engage in problematic viewing, have lower sexual satisfaction, and are more likely to engage in sexually compulsive behaviors. A quasi-experimental design was utilized allowing for the comparison between rural vs urban dwelling individuals and Latinx compared to non-Latinx individuals. These comparisons will be used to lead discussion around the primary findings.

4:00 - 5:00 p.m. **Palynology Of Mo Su Ridge, A Complete Exposure Of A Coal And Associated Sediments In The Hooper Formation, Wilcox Group, Texas**

CS-19

Alexander Newman*. Dr. Jen O'Keefe, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

Students and faculty at Morehead State University have been studying the poorly documented Hooper Formation in the lower-most Wilcox Group of central Texas since 2017. During a winter intersession trip in 2018 to the original study sites in McKinney Roughs Nature Park near Bastrop, TX, a new exposure of the coal in the upper Hooper Formation was located on a site dubbed 'MoSU Ridge.' This exposure permitted examination of mire-margin coal facies using palynology (this thesis) and organic petrography (Rogers, 2020) and more complete explanation of mire dynamics and ecosystem change during the Late Danian Event (LDE). An ash seam located 1/3 of the way through the Hooper coal has been dated to 62 MA, placing this at the onset of the LDE. Thus, the entire Hooper coal records the impacts of climate change before, during and after this hyperthermal event. Here we present the results of palynological study of this exposure. This project was completed for ESS 499C.

11:00 a.m. - 12:00 p.m. **Stream Sediment Monitoring In Morehead Kentucky**

CS-20

***Kristopher Krolikowski*. Dr. Jen O'Keefe**, Dr. Stephen Reid**, mentors,* **Department of Physics, Earth Science and Space Systems Engineering**, College of Science, Geology**, Morehead State University (Retired)**

Sediment loads in stream systems play a big role in how overall runoff behaves. Streams naturally transport sediment at various ratios depending on precipitation. When vegetation is removed in upstream environments, sediment loads on streams increase. Sudden increases of sediments in streams can cause many issues, such as flooding or stream re-direction. In Morehead, KY, large-scale logging operations on the ridge above Knapp Avenue and on the ridge above the north end of Allen Avenue have caused increased sediment load in a small stream called Oxley Branch. This stream flows south parallel to Knapp Avenue and along the eastern property boundary for the CHER building, before being channelized underground through the downtown district and emptying into Triplett Creek just upstream of Fast Change Lube and Oil on US-60. The entire area is flood-prone, and increased sediment load in Oxley Brach is known to cause sediment to build up in the underground section to the point that the stream is no longer able to drain effectively and flooding occur in upstream areas. This thesis examines the sediment loads and concentrations during high flow events along Oxley Branch as a means of elucidating potential flood risk.

2:45 - 3:45 p.m. **The Influence Of Videoconferencing On Relationship Formation**

CS-21

***Alexa Brunson*. Dr. Daniel Maitland, mentor,* **Department of Psychology, College of Science**

The COVID-19 pandemic has affected the ways we interact with those around us, this has led to an increase in how we engage with our social environment. Given the risks of in person interactions, the use of video conferencing as a means of social contact have increased. The increase in social isolation is correlated with meaningful increases in depression. This study looks at how individuals reporting and not reporting symptoms of depression interact in a virtual interaction structured to facilitate the development of feelings of connection. Specifically, it looks at how depression impacts the level of and perceived responsiveness to disclosure in an interpersonal task. We used Webex, a video conferencing software to conduct this study. Participants were randomized to a high disclosure or low disclosure condition in a stratified way based on their level of depression. In both conditions, participants were asked three sets of questions with surveys assessing their level of disclosure, perceived responsiveness, and feelings of connection between each set of questions. In the experimental condition, questions become more personal over time whereas in the control condition, no deeply personal questions are asked. Data collection is ongoing.

2:45 - 3:45 p.m. **The Role Of Depression And Fear Of Intimacy On Differences In Building Social Connection In Person Compared To A Video Chat Setting.**

CS-22

Emma Gundler*. Dr. Daniel Maitland, mentor, **Department of Psychology, College of Science**

Given the impact of Functional Analytic Psychotherapy (FAP) on interpersonal connection (Maitland et al., 2017), researchers interested in FAP have increasingly shifted their focus to understanding the processes and moderates that influence feelings of connection and intimacy (e.g., Kanter et al., 2020). Given the theorized role of intimacy (Maitland, 2020) in the development of loneliness, and the prevalence of loneliness and social isolation in the era of COVID-19 (Kilgore et al., 2020), understanding how digital communication impacts feelings of closeness has become increasingly important. The current study utilizes an established protocol for generating feelings of closeness (Aaron et al., 1997) and compares individuals who engaged in the experiment in person to those that completed the experiment through video conferencing software. Primary findings explore the vulnerability, responsiveness, and feelings of connection reported by each participant. Secondary findings exploring the influence of moderators on the process or outcomes of the experiment will also be presented. Findings will be discussed in the context of social connection in the age of COVID-19 and informing telehealth.

11:00 a.m. - 12:00 p.m. **Decade Long Monitoring Of Active Galactic Nuclei With Swift**

CS-23

Tithi Patel*. Dr. Dirk Grupe, mentor, **Space Science Center, Space Science Center**

I will report decade-long monitoring campaigns with the NASA Neil-Gehrels Swift mission of about 100 Active Galactic Nuclei (AGN). Swift has started with monitoring some AGN since 2005. This long-term monitoring project has enabled us to catch AGN in extreme high and low X-ray flux states allowing to trigger follow-up observations by XMM-Newton, NuSTAR, HST. While this program has led in the past to at least one trigger per year, no AGN was found with extreme variability. I will also give a brief overview of the causes of this extreme variability.

2:45 - 3:45 p.m. **Continuous Authentication Of Smartphone Users Using Machine Learning**

CS-24

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

Current smartphone security techniques offer less reliability. As an instance, personal identification numbers can be easily guessed or hacked, fingerprint scan requires hardware to operate, and face recognition can be affected by light, other people in the background, or different poses by the users. In addition, they are beneficial for one-time security, therefore commonly used at the time of login to verify users. However, what if there's a change of user while accessing the smartphone, and the phone is accessed by an intruder after login. To deal with this issue, continuous authentication is applied which regularly and unnoticeably will address the challenges of verifying users via behavioral features, such as keystroke, hand, and orientation activities. The goal of this research project is to design and implement a behavior-based security method and detect intrusion using machine learning. Hand-movement, grasp, and orientation are three behavioral features that can be effectively used to continuously authenticate users. In-built inertial sensors including accelerometer, gyroscope, magnetometer, and orientation are used to unnoticeably represent sensitive micro-movements of hand and orientation pattern when a user accesses the smartphone screen. The researchers in this project investigated large datasets of different smartphone users with different interaction sessions. To detect the behavior of smartphone users, various supervised machine learning algorithms were applied on the dataset of smartphone users. Experimental results show that the presented approach is promising and can be implemented effectively for continuous authentication of smartphone users. Currently, the researchers are also working on malware detection and classification for android security using deep neural networks such as convolutional neural networks (CNN).

2:45 - 3:45 p.m. **Design And Implementation Of An Innovative System For Automatic Recognition Of Asl Using Machine Learning**

CS-25

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

Deaf and hearing-impaired persons learn American Sign Language (ASL) as their natural language. There is a need to a new innovative technology that will enable deaf and hearing-impaired persons to communicate without difficulty anytime and anywhere with persons who do not know ASL. The proposed research project will introduce a novel approach to explore the problem of automatic real-time conversion from ASL to speech using motion sensors, machine learning, and mobile technology. The goal of this project is to design a smart system to capture and analyze hand movement and gesture using different types of sensors and machine learning algorithms. The new innovative system will be able to work in an adaptive way to learn new signs and to expand and improve the dictionary of the sign language. This system will have a wide range of applications for healthcare, education, gamification, entrainment, and many other applications. An optical hand tracking module such as Leap Motion Controller is used to capture and track the movements of hands. These movements are analyzed using several supervised machine learning algorithms to build predictive models to recognize different ASL gestures with a focus on a set of words.

2:45 - 3:45 p.m. **Design Of Machine Learning Algorithms For Behavioral Prediction Of Objects For Self Driving Cars**

CS-26

***Yevgeniy Byeloborodov*. Dr. Sherif Rashad, mentor,* School of Engineering and Computer Science, Smith College of Business and Technology**

Self-driving cars is a trending topic of the modern world. The ability to control a vehicle without human interaction can significantly increase safety on the road. In this research project, the main focus is on making the behavior of self-driving cars more like it was driven by a human driver in situations when pedestrians or animals are close by. While self-driving cars are equipped with cameras they can record and process the situations on the road and respond accordingly. It can be accomplished by image processing techniques, differentiation of objects, if they are alive or not, if they are moving or not, whether they are human or not and even from the determination of pedestrian's age. Analysis of such data shall provide a prediction of an object behavior. The algorithm that is being developed shall give a car increased safety for pedestrians and animals that may potentially appear in the vehicle's path. Computer vision library OpenCV, image processing, machine learning techniques and neural networks will be combined and used to build this algorithm. Presented is the current progress of this research project to design machine learning algorithms for the behavioral prediction of objects for self-driving cars.

2:45 - 3:45 p.m. **Emotion Recognition Using Brainwave Datasets**

CS-27

***Bethlehem Seid*. Dr. Heba Elgazzar, mentor,* School of Engineering and Computer Science, Smith College of Business and Technology**

The purpose of this research project is to analyze the brainwave data collected from MUSE EEG headband and use machine learning techniques to select a small number of features and accurately predict the emotional state of an individual. The brainwave dataset records the reading of the MUSE EEG headband. Supervised machine learning techniques are designed and implemented on a brainwave dataset to predict positive, negative, and neutral emotional state. The classification algorithms: K-Nearest neighbors (KNN), Random Forest, and Artificial Neural Networks (ANN) are used in this research. Further, the dimensions of this dataset were also reduced without compromising the accuracy of the results using principal component analysis (PCA), SelectKBest, and ReliefF algorithms. The results were promising with 96.7% accuracy.

4:00 - 5:00 p.m. **Factors Associated The Underrepresentation Of Female Head Coaches In Intercollegiate Athletics**

CS-28

***Chloe Whitlock*. Dr. Steve Chen, mentor,* School of Business Administration, Smith College of Business and Technology**

Past studies had shown the underrepresentation of females in the coaching profession. The purpose of this study was to examine the contributory factors to the underrepresentation of female head coaches in intercollegiate athletics. To further examine this issue, two studies were conducted to examine the perceptions of 124 current NCAA Division-I athletic coaches and 163 high school educators. Based on collegiate coaches' responses, the factor analysis identified four important constructs that contribute to the success of female coaches' job obtainment. According to the results of the second study, the high school educators (n = 163) believed there were gender biases and an underrepresentation of female coaches existed in athletics. They also agreed that adding women to leadership positions would improve the overall performance of teams. In general, the findings of both studies reaffirmed the conclusions provided by past studies concerning the factors and issues that might affect the career success and job obtainment of a potential female coaching candidate (Fryklund, 2019; Hensley & Chen, 2019; Thompson, Terron, & Chen, 2020). Limitations of the study and directions for future studies were further discussed.

4:00 - 5:00 p.m. **Predicting Covid 19 Infection Groups Using Social Networks And Machine Learning Algorithms**

CS-29

***Kyle Spurlock*. Dr. Heba Elgazzar, mentor,* School of Engineering and Computer Science, Smith College of Business and Technology**

Today, social media has grown in usage to the point where it is often deeply intertwined with life offline. People share their thoughts, passions, and lives online, and in many ways these social networks can be considered abstractions of real-world society. The idea for this research is that by modeling on these social networks, these glimpses into people's lives through their words and posts is capable of showing their current health situation, and their susceptibly to outside influences affecting it. The goal of this research project is to design and implement unsupervised machine learning techniques to group together sub-networks of connected individuals in hopes that it may be beneficial to current disease surveillance systems. Using the Python programming language and the libraries available to it, data was collected from the social network platform Twitter, and analyzed using three clustering and centrality measurements. The criterion to be included in the data found tweets containing symptomatic key words, like those of which experienced by people afflicted with the novel coronavirus disease (COVID-19). It is our findings in this research that by simulating the real-world connections that people have using their virtual connections, their surrounding cliques become discoverable. Providing new possibilities for viral control and disease prevention using easily sourced, and quickly gatherable information.

4:00 - 5:00 p.m. **Testing Turmoil**

CS-30

Laura Von Mann*. Dr. Christopher Beckham, mentor, **Department of Early Childhood, Elementary and Special Education, Volgenau College of Education**

Test anxiety affects students throughout all grade levels, higher education, and even into adult life, at various levels of severity. With standardized testing becoming increasingly more present in the American school system, the condition known as test anxiety has also become a more prevalent topic amongst researchers and educators. This research aims to better understand test anxiety, its symptoms, causes, and possible treatments in order to ensure student success.

4:00 - 5:00 p.m. **College Students' Persistence In Stem: A Case Study Of Graduating Seniors**

CS-31

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

According to several published reports, there are nearly 9 million science, technology, mathematics, and engineering (STEM) jobs in the United States, 6.2 % of total national employment. Despite a booming employment landscape, the U.S. is not graduating enough STEM majors. Attrition occurs when a student who entered college intending to graduate with a STEM degree decides to switch into nonSTEM majors, or may drop out of college altogether. Recent national statistics uncovered that STEM attrition is more serious in quantitative fields, such as mathematics, physics, chemistry, and engineering. One way to minimize the factors associated with STEM attrition is to learn from the experience of graduating seniors who persisted in STEM. Since these students are overcoming academic and non-academic issues that may have caused them to switch majors, their feedback is essential in helping shape intervention and mentoring strategies for future incoming freshmen. The purpose of this study is to use a case-study methodology and a structured-interview data collection protocol to better understand to what extent a sample of graduating biology, chemistry, physics, mathematics, and space science seniors encountered a number of factors frequently associated with STEM attrition, and how they were able to overcome these potential obstacles.

Asynchronous

A Lifetime Of Purpose: The Rock Fork Community Center, The Rock Fork Attic, The Attic

CS-32

***Cheyenne Smith*. Dr. Joy Gritton, mentor,* School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

A strong sense of community is a hard thing to come by these days, knowing the history of a place that used to be the center of a now sparse community is even harder. This presentation will explore one such history in the hope of inspiring community building through essential common spaces. The Rock Fork Community Center, now simply known as Rock Fork Attic or just The Attic, began as a place for the small community of Rock Fork in Knott County, Kentucky, to gather. For many years the community came together there for social events, fund raisers, school activities, and charity auctions. The center was kept alive in its early years by the community alone. Among its many purposes, The Attic also served for a time as a daycare and schoolhouse. In its later years it housed a local business and was a designated place to vote until 2018. In its prime as the Rock Fork Community Center, it was also a place for local artisans to come together. The Attic hosted many a quilting circle and auction to sell local handmade items. The center is located on the presenter's family private property, and her great-grandmother was part of the first family to settle in Rock Fork, the last living member of the original community center board, and the last living member to use The Attic. The Attic is no longer open to the public, but it can still live on as a model for the diverse ways similar centers may serve small communities.
Cheyenne Smith is a double major in Art and Engineering and Construction Management at Morehead State University. She is a local artist herself coming from a line of artisans from the small community of Rock Fork. Cheyenne has an accomplished small business, is a published illustrator, and is known throughout her community for meeting local artistic needs.

Key words for submission: Architecture, Historic Buildings, and Historic Sites, Arts and Art History, History

Asynchronous

A Pilot Study Using Tic Tac Toe To Introduce Quantum Mechanics And Quantum Computing

CS-33

***Keaghan Knight*. Dr. Joshua Qualls, mentor,* Department of Physics, Earth Science and Space Systems Engineering, College of Science**

There are several difficulties with introducing students to quantum mechanics and quantum computing in most settings. For many students, their first exposure is only after years of basic and advanced mathematics and multiple introductory physics courses in physics. A pilot study was designed to explore the possibility of introducing fundamental concepts of quantum computing and quantum mechanics in a concise standalone module using educational games. The research subjects (N=50) completed identical pretest and posttest separated by introductory quantum computing curriculum. This curriculum is introduced and reinforced using Tic Tac Toe, a "Semi-classical" Tic Tac Toe and Quantum Tic Tac Toe. We report on the results of this pilot study and the planned modifications before launching our upcoming research study to investigate the educational effectiveness of this tripartite lesson plan.

Asynchronous

Adverse Experiences, Depression, And Parenting Sensitivity.

CS-34

***Lauren Oldiges*, Savannah Gillis, Tiffany Hicks*. Dr. Shari Kidwell, mentor,* Department of Psychology, College of Science**

Parental sensitivity is a key determinant of attachment security and child well-being. Yet many parents in our region face challenges to parenting, such as increased exposure to adverse experiences and depression. Both cumulative exposure to adverse experiences and depression symptoms have been associated with increased risk to parenting (Hays-Grudo & Wilson, 2020). The present study explores connections between parents' sensitivity/synchrony scores on the Toddler CARE-Index (TCI: Crittenden, 2007), Adverse Childhood Experiences (ACEs) amongst parents, and parental depression. As part of a larger longitudinal study of Eastern Kentucky families, 35 children (mean age 4.5 years) and their parents participated in the Strange Situation (Ainsworth, Blehar, & Waters, 1978). This separation-reunion procedure places caregivers under some stress. Higher TCI ratings, on a 15-point scale, indicate which parents modify their behavior to stay consistently sensitive to their child's needs. Parents also completed an interview about their childhood with their families. These were rated for the presence of trauma (most often sexual abuse); family substance abuse; loss of a parent (usually separation); excessive physical discipline; and emotional abuse. The Center for Epidemiological Studies Depression Scale assessed parents self-report of these symptoms. Although coding with the TCI is ongoing, analyses with 28 families indicate that sensitivity scores are associated with both parental depression and their ACEs exposure. These findings suggest a role for sensitivity in the intergenerational transmission of risk.

Asynchronous

Celebration For Student Scholarship Abstract: A Preliminary Examination Of Solar And Lunar Contributions To Sqm Readings At Zenith

CS-35

***Laura Cadwallader*. Dr. Jennifer Birriel, Dr. Kevin Adkins, mentors,* Department of Physics, Earth Science and Space Systems Engineering, College of Science**

Unihedron Sky Quality Meters (SQMs) are designed to measure zenith sky brightness (ZSB) at night; in astronomy, zenith is an imaginary point in the sky directly above a particular location. A casual observer will note that the brightness of the sky increases as the sun or full moon rise. Less obvious is that even when these objects are below the horizon, light is scattered towards zenith by Earth's atmosphere. Here we use SQM data acquired on clear, new moon nights to determine the ZSB as a function of solar depression angle. Likewise, we use SQM data acquired on clear, full moon nights to determine ZSB as a function of lunar depression angle: in this case, we must subtract off the contribution from the Sun, which sets while the full moon rises. We discuss our data selection criteria to identify useful archival data collected here at MSU over an 18 month period and our next steps in the study.

Asynchronous **Ceramic Studio Assistant**

CS-36 ***Allison Jones*. Mr. Adam Yungbluth, mentor,*** **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

The research project will focus on learning the various activities involved in running a college level Ceramics Studio. Activities will include clay mixing for Ceramics 1 courses, mixing studio glazes & slips, firing bisque, reduction, soda, & wood kiln, and other activities to improve the Ceramics Studio.

Asynchronous **Cultivating Gratitude And Learning: Virtual Agriculture Education For Elementary School Students**

CS-37 ***Heather Smith*. Dr. Joy Gritton, mentor,*** **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

In a time when the majority of young children know more about a computer than agriculture, this project brings agriculture to them in a unique way. This presentation introduces a program that aims to connect elementary students with the vast agriculture industry in the digital age using appropriate technology. The project consists of teaching children in Eastern Kentucky and beyond about agriculture and land use through the virtual dissemination of relevant stories, facts, and activities. In this way children can learn how agriculture is vital to their everyday life. Featured topics include horticulture crops, agronomic crops, livestock, and the history of agriculture practices in Appalachia. The information is being shared through the Facebook social media platform using a page entitled, “Little Aggies. The project's goal is to foster learning about agriculture in an intriguing way, while encouraging reading and greater appreciation for plants, animals, and all living things.

Asynchronous **Developing A Simplistic Model Of Covid 19**

CS-38

***Elizabeth LaBreche*. Dr. Timothy O'Brien, mentor,* Department of Mathematics, College of Science**

This presentation examines the dynamics of COVID-19 and the factors which affect outcomes within a population. A Susceptible-Exposed-Infected-Recovered compartmental model was developed to represent the various disease-states of a population. Euler's Method was used to find approximate solutions of the first-order differential equations governing the compartmental model. The model was applied to a population approximately the size of Louisville, KY in order to simulate a possible outcome of events for the largest metropolitan area in the state. Three scenarios were addressed using the developed model: one resembling the historical course of the outbreak, one in which a mask mandate was applied early in the course of the outbreak but individuals still chose to gather during the holiday season, and one in which a mask mandate was applied early in the course of the outbreak but individual refrained from gathering. Outcomes suggest that significant morbidity and mortality is expected except when masking is applied early on in the outbreak and individuals refrained from gathering during holidays.

Asynchronous **Documenting Night Sky Brightness Using Sky Quality Meters**

CS-39

***Ryan Sergent*. Dr. Jennifer Birriel, mentor,* Department of Physics, Earth Science and Space Systems Engineering, College of Science**

The use of artificial light at night contributes to light pollution across the globe. Prior to 2005, artificial sources of light at night were mainly high- and low-pressure sodium light sources, which are yellow rich. The increased use of LED lighting is changing spectral signature of the night sky is changing. LEDs emit a peak in blue light. Blue light is scattered much more effectively than yellow and red, increased use of LEDs will increase both glare and skyglow. Unihedron's Sky Quality Meter (SQM) is an instrument used widely by astronomers to measure the luminance of the night sky. Data collected from the SQM can be used to quantify the skyglow aspect of light pollution in terms of magnitudes per square arc second (MPSAS). With the use of colored filters, the spectral signature of the night sky can be measured. We used two sets of portable SQM's that each consist of four meters which measure the MPSAS in different wavelengths: clear (L), green (G), red (R), and blue (B). Our preliminary work includes an intercomparison of each pair detectors with matching color filters. We describe our calibration procedure and examine preliminary data. Once the intercomparison is complete, the SQMs can be used to compare the amount of artificial light and its spectra at different locations.

Asynchronous

Effects Of The Coronavirus Pandemic On United States Custom Grain And Forage Harvesting's Labor Supply And The 2020 Harvest

CS-40

***Dalton Black*. Dr. Jason Holcomb, mentor,* School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

The global coronavirus pandemic disrupted migratory labor around the world, including foreign seasonal labor that travels to the United States to work in the mobile custom grain and forage harvesting industry that operates primarily in Great Plains states. The pandemic caused the United States to implement bans on travel from labor sending countries, and to delay the processing of the H-2A and J-1 visa nonimmigrant visas used by foreign custom grain and forage harvesting employees to enter the US. Many transnational workers were thus delayed or prevented from reporting for jobs that require training before harvest begins in April or May, creating a critical situation for mobile custom harvesting employers in moving their equipment to the fields and having enough workers to harvest the crops in the usual time frame. The J-1 visa process is administered by the US Department of State while the H-2A visa process is more complex and administered by the US Department of Labor, the US Department of Homeland Security, and the US Department of State, all part of the US public employment service (PES). Annual wheat harvest labor problems in the Great Plains played a significant role in the formation and development of the PES in the United States. Since a shortage of domestic United States labor began in the 1990s, mobile custom harvesting operations have relied on the PES to obtain workers from South Africa, New Zealand, Australia, and numerous European and other countries to meet their labor needs. This research uses information gathered from custom harvesting employers and a private labor agency in the United Kingdom to understand when and how these disruptions occurred, and how they affected the labor supply and 2020 harvest. Survey results reveal that more than half of the respondents' 2020 workforce was expected to be from foreign countries, causing significant problems in finding enough domestic workers to replace foreign workers who were prevented from traveling to the US. Some employers have downsized their operations due to labor problems, and foreign labor may again be scarce in 2021.

Asynchronous

Ekap Website Design

CS-41

***Tayler 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 arts and music. 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 culture 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 presentation will discuss a variety of components being updated (beginning in January 2021) and some of the initial design choices that have been made regarding color and navigation. Ideas for moving forward will also be addressed.

Asynchronous **French Textbook Illustrations**

CS-42

***Abigail Hall*, Nicholas Anderson*. Dr. Karen Taylor, mentor,* School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

This project has been an update of an introductory French textbook in order to make the work more cohesive illustratively. Each week we were given a drawing task to go with a chapter or vocabulary assignment to replace, revamp or develop new art work of greater value than the preexisting illustrations.

Asynchronous **Lbj's Lost Legacy: An Analysis Of America's Vietnam War President**

CS-43

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

Succeeding President John F. Kennedy, Lydon Baines Johnson inherited a myriad of affairs. Larger-than-life LBJ, however, was up for the challenge. He stepped into the role boldly and won the 1964 presidential election with a landslide victory. Yet, Johnson underestimated the complexity of Vietnam, as each previous president had claimed victory over the dilemma. He entered the White House with numerous grand aspirations, but many of them, especially his beloved Great Society, became overshadowed by Vietnam. Despite hoping to avoid the moniker of "War President," LBJ left the office feeling defeated by the small country in South East Asia. The rapid deterioration of the situation in Vietnam was in-part due to LBJ's crisis management decision-making method. The decision-making process of Johnson was influenced by much more than his Tuesday lunches with the Awesome Four, in which he convened with McGeorge Bundy, Robert McNamara, and Dean Rusk to form policy specifically for the Vietnam conflict. Johnson's experiences before his presidency were the ultimate determinant of his faulty leadership choices throughout the Vietnam War; his Texan upbringing, service during the Great Depression, and involvement with periods of conflict constructed his approach to directing combat. These defining moments of LBJ's life guided him into a war he could not overcome and prompted decades of unrest among the American people.

Asynchronous

Low Stress Handling Techniques In Shelter Animals And The Overall Effects On Physiological Parameters

CS-44

Ashley Swim*, Courtney Smart*. Dr. Amy Staton, mentor, **Department of Agricultural Sciences, College of Science**

Animal shelters tend to be a very stressful environment for dogs as there are many new sounds, smells, and animals. This stress is not only bad for their psychological health and can lead to behavioral issues, but it can also have an impact on their physical health. Stress impacts multiple systems of the body, resulting in increased heart rate, blood pressure, respiratory rate, temperature and even blood glucose levels in dogs. The impact stress has on these systems can lead to a compromised immune system and increases the probabilities of the dog becoming ill. However, by using Fear Free methods, there are many steps that can assist in reducing the animal's stress. These methods target multiple senses such as hearing, smell, touch, and taste. By using pheromones, calming music, reducing excess noise, using minimal restraint, speaking softly and positively, using treats as a distraction and reward, and simply petting the animal can all reduce the stress levels in a dog. In an already very stressful situation, the simple task of giving a subcutaneous injection can cause even more undo stress and changes in the animal's physiological parameters.
This study included thirty-four dogs of various breeds between one and seven years of age. The dogs were separated into two groups. Group 1 used traditional restraint techniques and Group 2 used Fear Free techniques. Each dog received a 1-milliliter subcutaneous injection of sterile saline in the left hind limb. Physiological parameters were taken pre and post-injection. These parameters include temperature, pulse, respiration, blood glucose, and blood pressure. Fear Free handling resulted in a greater decrease in the majority of the physiological parameters which suggests that Fear Free techniques lead to less overall stress in the shelter animals when compared to traditional handling.

Asynchronous

Schwarz Christoffel Mappings In Undergraduate Mathematical Physics

CS-45

***Richard Knupp*. Dr. Joshua Qualls, mentor,* Department of Physics, Earth Science and Space Systems Engineering, College of Science**

Interdisciplinary courses like PHYS481/MATH481 “Mathematics for Scientists and Engineers” play an important role in undergraduate curriculum: physics students get exposure to advanced mathematical ideas that they might otherwise miss in their undergraduate studies, and both mathematics and physics students get experience directly applying mathematical ideas and techniques to real-world problems. Several in-state and peer institutions offer an additional course in mathematical physics. Although the advantages of a second course are plentiful, Morehead State University currently does not. In this talk we report on the progress of creating the cross-listed course “Advanced Mathematics for Physics” and mathematical techniques currently missing from coursework that would be most beneficial to graduating physics majors. As an example, we focus specifically on Schwarz-Christoffel (SC) transformations from complex analysis. SC transformations are functions that map points in the extended upper half of the complex plane to the vertices of a polygonal region. These mappings are quite useful in the realm of physics; in a general sense these mappings can be useful in contexts such as electric fields, magnetic fields, and fluid dynamics. For this project, it is specifically helpful when working in the context of electric field distributions and electric potentials within that electric field distribution. We conclude by discussing our computational project that introduces students to these SC transformations and helps them apply SC transformations in an appropriate physics context. This computational project introduces the SC transformation and implements these transformations in both Python and Mathematica.

Asynchronous

The Art Of Preservation

CS-46

***Sinclaire Dorsey*. Ms. Melissa Yungbluth, mentor,* School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

Proper preservation of creative works is imperative to sustaining documentation for future generations’ education. Exhibition designers, such as the students awarded with the undergraduate research fellowship for the Golding-Yang gallery, must be mindful of the environmental factors that impact creative works. For instance, light sensitivity of the materials can be overwhelmed by ultraviolet and infrared radiation produced by the sun. Atmospheric humidity, when not regulated, will destroy irreplaceable artwork that could provide future historians a better understanding of modern culture. Extreme temperatures are devastating to the preservation of artistic works. The regulation of these environmental factors will provide future generations a resource to learn about the cultural of the 21st century.

Asynchronous

The Pitcher Is Throwing Heat: Preference Of Figurative Discourse In Athletes And Non Athletes

CS-47

Lindsay Anderson*. Dr. Lynn Haller, mentor, **Department of Psychology, College of Science**

The use of metaphor is distinctive and evident in every day human language. Previously, we demonstrated that humans easily produce metaphors when prompted. The current investigation explored whether various populations preferred known sport metaphors versus the literal translation. Coaches and players often express their understanding and expectations of sports through non-literal language. Understanding this narrative is effective for athlete's comprehension is essential in improving a team or individual performance. Long ago, Ortony (1975) praised the effectiveness of figurative language as a communication tool. The current study uses those principles to investigate the use of metaphor's validity in a sport context. Communicating the athletic experience is difficult due to its physiological nature. We believe that through metaphor physiological experiences will be more concrete. For example, metaphors are often used in sport to make abstract concepts easier to conceptualize. Our current measured athletes' and non-athletes' preference for sport metaphoric speech. We believed that metaphors would be the preferred way to discuss sport concepts. Preliminary results showed that athletes preferred the use of metaphors more frequently than nonathletes. Results also showed that men preferred the use of metaphors more frequently than women.

11:00 a.m. - 12:00 p.m. **Asynchronous Delivery Format: Differential Effects On Performance And Engagement**

CS–48

***Jessica Hamm, Leah Hayes, Makayla Reynolds, RaeAnna Whitaker, Reganne Miller*. Dr. Gregory Corso, mentor,* Department of Psychology, College of Science**

In recent years, the number of online courses offered to students has increased. This increase brings the question of what format of online learning is the best for students. The purpose for this study was to investigate the effects of three asynchronous presentation formats on participant performance and engagement: slides with video-audio, slides with audio, and slides alone. We hypothesized significant differences among the formats in participant performance and engagement (best in video-audio format, worst in slides alone format). Participants (N=27) were randomly assigned to one of the three formats. Each format presented information about a fake island created by the research team. Participants completed a pre and post-exam on lesson content (performance measure) and an exit survey on engagement (engagement measure). ANOVA revealed significant differences in responses to two exit survey questions among formats, $F(2,24)=4.0$, $p.<.05$. LSD test showed that this difference was between the audio and video-audio formats. This result indicates that participants in the audio format were more engaged in lesson content than those in the video-audio format. ANOVA found a significant difference between pre and post-exam scores ($F(1,24)=258.5$, $p.<.01$), showing that the information presented effectively facilitated learning. No main effects for presentation formats or interaction with presentation formats were found, suggesting that the presentation formats were equally effective at facilitating learning. Overall, the results suggest that narration should either be included alone or not at all with textual presentations for maximized student performance and engagement. Additional results, implications, and limitations are discussed.

Asynchronous **French Text Illustrations (Hon)**

CS–99

***Abigail Hall*, Nicholas Anderson*. Dr. Karen Taylor, mentor,* School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

This project has been an update of an introductory French text in order to make the work more cohesive illustratively. Each week we were given a drawing task to go with a chapter or vocabulary assignment to replace, revamp or develop new art work of greater value than the preexisting illustrations.

12:15 - 1:15 p.m. **Catalogue Of Lichen Species In The Rowan County Sphagnum Swamp, Rowan County, Kentucky**

ℙ−𝟙

DeAnna Kidd*. Dr. Allen Risk, mentor, **Department of Biology and Chemistry, College of Science**

Rowan County Sphagnum Swamp is one of the best remaining examples of a bottomland swamp forest left in the Knobs region of Kentucky. Bottomland swamp forests are characterized by soil with a high percentage of organic matter above clay and Devonian shale. This arrangement leads to standing water much of the year and a strongly acidic soil. Common tree species in the Rowan County Sphagnum Swamp include Acer rubrum (red maple), Quercus palustris (pin oak), Liquidambar styraciflua (sweet gum), Nyssa sylvatica (sour gum) and Betula nigra (river birch). Bottomland swamp forests used to be more common, but have dwindled due to land clearing for timber and agriculture. The research project included cataloging the species of lichens found in the Rowan County Sphagnum Swamp through five field trips to the study site. Eighty-five collections were made with samples being deposited in the Morehead State University Herbarium (MDKY). Lichen samples were identified using dissecting and compound microscopes, C (bleach) and K (KOH) chemical tests, and observation under ultraviolet light. Common species of lichens included Buellia erubescens, Lecanora hybocarpa, Punctelia rudecta, and P. missouriensis. Uncommon species included Lecanora thysanophora.
This research was supported by a Morehead State University Undergraduate Research Fellowship.

12:15 - 1:15 p.m. **Factors For Success In Rural Tourism: A Case Study Of Eastern Kentucky**

ℙ–2

Bethany Allen*. Dr. Vijay Subramaniam, mentor, **Department of Agricultural Sciences, College of Science**

Short Abstract:
An investigation of what factors contribute to a successful rural tourism development in Morehead and Eastern Kentucky. Through an assessment of the resources available to Morehead, factors that make a business successful in this area have been found and better understood. A collection of Morehead tourism statistics and as well as a collection of statistics for the state of Kentucky will be used.
Long Abstract:
This research study examines the variables of tourism that influence a traveler's decision when traveling in Eastern Kentucky, specifically Morehead, Kentucky. Morehead is a destination with great potential to be built into a prominent location for tourism in Kentucky. To best understand the potential of the area, the resources available and the existing tourism locations were accessed to build the foundation of this project. Successful tourism destinations around the state of Kentucky have been assessed to determine what factors contribute to their success as well as what tactics/resources the businesses use to draw people in. In comparison to successful tourism destinations in the Lexington, Red River Gorge, Louisville, Bowling Green, and Newport areas, Morehead is lacking in the attractions that draw guests in to stay for longer than one day. Upon further study, Morehead was found to be an ideal location due to the college presence and the natural attractions such as Cave Run Lake and the Daniel Boone National Forrest as well as Morehead's easy access to the interstate. Morehead is lacking in hotel room availability, night life, extended store hours, and access to services such as Uber and Lyft.

12:15 - 1:15 p.m. **Fall And Rise: Changes In The Fish Community Of Triplett Creek Following Restoration Of A Channelized Reach.**

ℙ−3

Austin Spradlin*, Jonathan Eisenhour. Dr. David Eisenhour, mentor,
Department of Biology and Chemistry, College of Science

In the early 1970s, Triplett Creek in Morehead, Kentucky, was straightened, deepened, and widened, resulting in a rather homogenous aquatic habitat, varying little in depth, flow, and substrate. In summer of 2018, a section of the stream was "restored" in order to alleviate the bank instability and flooding problems created by the 1970s channelization, restore the health of its aquatic community, and improve recreational opportunities. Our goal was to examine changes in the fish population resulting from the extensive changes to the channel and substrate during the restoration. We studied the fish populations at four sites (two sites in the restored area and two unaltered reference sites) in June of 2018, just before the restoration work occurred, and then four times after the work occurred, in October 2018, June 2019, October 2019, and October 2020. Fishes were qualitatively sampled using backpack electrofishing and seining. Encountered fishes were identified and counted, which allowed us to assess the fish community health using the Kentucky Index of Biotic Integrity (KIBI). In June 2018, prior to any restoration work, the four sites had KIBI scores between 59 and 70, all of which rated as "good". The two sites in the restored area had a higher proportion of nonnative species, and fewer darters compared to the reference sites. In October 2018 and June 2019, after the restoration work, the restored sites declined slightly in KIBI scores, had reduced number of species detected, especially species considered "intolerant" by KIBI, and had reduced number of darter species, while the control sites showed little change. However, in October 2019 and October 2020, KIBI metrics had greatly improved in the restored sites, becoming similar to, or surpassing, KIBI metrics in the reference sites. However, the restored sites still have considerably more nonnative species than do the reference sites, perhaps because riparian vegetation and large woody debris has yet to be established in the restored sites.

12:15 - 1:15 p.m. **Fungi In A Warmer World An Overview Of Fungi During The Middle Miocene Climate Optimum**

ℙ–4

Jolene Fairchild, Jonathan Rose, Laikin Tarlton, Savannah Jones*, Tyler Spears. Dr. Ingrid Romero, Dr. Jennifer O'Keefe, mentors, **Department of Biology and Chemistry, College of Science**

Fungal activity is a key driver of terrestrial carbon cycling, and the distribution and diversity of fungi are closely related to local ecosystem structure. This makes fungi a powerful tool for understanding how ecosystems react to climate change, however the long-term, large-scale datasets needed to do this do not exist, and cannot be built on the timescale of single human lifetimes. They can, however, be built from the fossil record, although, to date, we do not have enough information about the composition of fossil fungal communities to generate accurate models to use to predict fungal responses to today's climate crisis. The "Fungi in a Warmer World" (FiaWW) project is tasked with building the first dataset of this kind. Students affiliated with FiaWW are studying the fungal assemblage composition and diversity preserved in rocks deposited during the Middle Miocene Climate Optimum, the warmest interval of the last 16 million years, and considered the best analogue for the modern-future climate scenarios. By analyzing samples from different places around the world, we can determine how 1) fungal biodiversity, 2) the frequency of phytopathogens, and 3) the distribution of agriculturally important fungi changed in relation to climate change. In collaboration with scientists at Northumbria University, we will use this information to model fungal community response to future climate change. Here we present the framework for our overall study.

12:15 - 1:15 p.m. **Identification Of Kentucky Land Snail Species**

ℙ–5

Tessa Whalen*. Dr. Allen Risk, mentor, **Department of Biology and Chemistry, College of Science**

Land snails are members of the Phylum Mollusca and the Class Gastropoda. The importance of land snails to their native ecosystems has been greatly underestimated and understudied. For example, land snails play a huge role in the cycling of micronutrients in their ecosystems, they are active in the dispersal of plant seeds and fungal spores, and they have been shown to be bioindicators for vertebrates of conservation concern. They also contribute to the ecosystem by leaving their shells behind when they die, which is then used as a source of calcium carbonate by many species, and used in the formation of limestone. There are approximately 194 native species of snails in Kentucky, not including the 10 introduced species. The purpose of this investigation was to learn the morphology of land snail shells in order to improve identification skills. Important features used to identify land snails include the shell shape, the diameter of the shell, the reflection of the aperture lip, the umbilicus, the teeth associated with the aperture, and the number of whorls. Several local genera such as Punctum, Discus, and Haplotrema have a distinctly wide umbilicus, while genera such as Glyphyalinia, Stenotrema, and Mesodon are considered perforate to imperforate, or without an open umbilicus. The genera Triodopsis, Euchemotrema, Inflectarius, and Xolotrema all have large teeth in the aperture that can be used to identify the species based on the size and position of the teeth. This research was supported by a Morehead State University Undergraduate Research Fellowship.

12:15 - 1:15 p.m. **Microns Matter Methods In Thin Section Manufacture And Analysis**

ℙ–6

Nathan Sparks*. Dr. Jennifer O'Keefe, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

The “Boudreaux Bend Bends” are an enigmatic set of alluvial, fluvial, and lacustrine sediments that are incised by the modern North Fork of Triplett Creek fluvial channel. These beds contain an abundant palynoflora and multiple leaf beds. However, no information exists about their sediment source, and there is much debate about the environments in which the sediments were deposited. Sedimentary petrology and grain-size analysis data will help resolve this debate and provide the information needed about the depositional system prior to publication of the palynology results. Before these analyses could be undertaken, however, the thin section machines needed to be repaired and skill in thin-section polishing developed. This presentation outlines the process making grain-mounts of sediment, resurfacing the thin-section machines’ plattens so that micron-scale wafers of grain-mounts could be cut, cutting thin-section wafers, and the polishing process needed to produce even 30-micron thick thin sections.

1:30 - 2:30 p.m. **Parental Sensitivity And Children's Emotion Regulation Development**

ℙ–7

Griffin Newell*, Olivia Kee. Dr. Shari Kidwell, mentor, **Department of Psychology, College of Science**

Parental sensitivity is critical in the development of children’s attachment to their caregivers. Sensitivity refers to a parent's ability to understand and react synchronously with their child's emotions. Covert hostility is a form of insensitivity in which parents are subtly dismissing. The current study examines both parenting constructs during a frustration task, in relation to child behavior in an emotion interview. As part of a larger longitudinal study, 35 children (average age 6 years) and their parents waited eight minutes for children to be permitted to open a bag of prizes. Parental reactions to their children's behaviors were coded into fifteen-second intervals for sensitivity and covert hostility, based upon guidelines from the Emotional Availability Scale (Biringen, 2000). Sensitive parents responded in ways that would help their children wait effectively, while covertly hostile parents were impatient or teased their child. A separate interview involved the children discussing their experiences with six emotions. This interview was coded on 4 point scales indicating the child's level of engagement and adaptive regulation of their emotions and behavior. Preliminary results revealed a significant association between covert hostility and children’s internalizing symptoms, suggesting children whose feelings were dismissed during the frustration task tended to show distress while articulating their feelings in a separate interview. The purpose of this presentation is to see if the associations held up as significant after the coding of all participants was finalized.

1:30 - 2:30 p.m. **Past Sexual Assault, Daily Posttraumatic Stress Symptoms, And Sexual Functioning: The Role Of Pre Sex Drinking**

ℙ−8

Natalie Fyffe*. Dr. Elizabeth Neilson, mentor, **Department of Psychology, College of Science**

PAST SEXUAL ASSAULT, DAILY POSTTRAUMATIC STRESS SYMPTOMS, AND SEXUAL FUNCTIONING: THE ROLE OF PRE-SEX DRINKING

N. Fyffe, E. C. Neilson, & E. R. Bird

Women with a history of adolescent or adult sexual assault (ASA) report difficulties with sexual functioning. One hypothesized contributor is posttraumatic stress (PTS), however, for whom and under what circumstances PTS affects sexual functioning is unclear. While ongoing research has found that some ASA survivors may drink to cope with PTS symptoms, little research has examined the association between PTS, pre-sex drinking, and sexual functioning at the proximal level. This study examines the moderating effects of number of standard drinks prior to sex on the indirect association between ASA and sexual functioning via PTS symptoms. Method: First- and second-year college women (N = 286; M = 18.85, SD = .85) completed an online, longitudinal survey assessing past ASA and reported on the number of standard drinks consumed prior to sex and sexual functioning during their most recent sexual encounter in the last six weeks. PTS symptoms occurring on that day were also assessed. Moderated indirect effects were tested using a path analysis with 10,000 bootstrap resamples and probing interactions at the mean and one standard deviation above and below the moderator. Childhood sexual abuse and number of non-sexual traumatic events were included as covariates. Results: The indirect effect of past ASA severity to sexual functioning via PTS was moderated by number of standard drinks before sex ($\beta = -.45$, $p < .01$; 95% CI [-.54, -.36]). For women who reported a low (0-1.5) and mean (4.08) number of drinks, past ASA severity was negatively associated with sexual functioning ($\beta = -.16$, 95% CI [-.29, -.03]; $\beta = -.08$, 95% CI [-.13, -.01]) through PTS symptoms. The indirect association of past ASA severity to sexual functioning via PTS symptoms was not significant for those who reported heavier pre-sex drinking (> 6.5 drinks). Conclusion: Daily PTS symptoms were negatively associated with sexual functioning among women who drank low or average number of standard drinks prior to sex. Future research may wish to examine drinking motives to elucidate whether some ASA survivors may drink to ameliorate the association between PTS symptoms and sexual functioning. Alcohol interventions for college students may wish to assess sexual functioning difficulties and PTS as potential treatment targets.

1:30 - 2:30 p.m. **Quantitative Sampling Of Ant Populations In Rowan County As A Measure Of Biodiversity In Rowan County Woodlands.**

ℙ−9

Amber Schifano*, Anna Grace Ehr*, Maiyuki Druen*. Dr. Charles Lydeard, Dr. Sean O'Keefe, mentors, **Department of Biology and Chemistry, College of Science**

Biodiversity is an important metric used for conservation efforts and ecological assessments. Biodiversity is defined as the measure of taxonomic diversity within an area. Several groups of organisms have been used as surrogates to assess overall biodiversity for an area, for example plants, mammals, birds, beetles, etc. Ants represent another surrogate taxon for assessing biodiversity because ants are found in many types of habitats, fulfill a variety of ecological roles, are diverse, and are numerous. Leaf-litter samples were collected from three wooded sites in Rowan County: Eagle Lake, Stoney Cove, and Rodburn Hollow between the months of August and October in both 2019 and 2020. Ants were extracted from the leaf-litter using Berlese funnels which are used to extract arthropods from soil. The ant specimens were organized, identified, counted, and labeled to analyze the biodiversity among the different ant habitats collected. A total of 6,225 ants, and 15 genera were collected across the samples. Additionally, there are several useful indices for ant alpha and beta diversity evaluation including, Shannon and Simpson indices. The Shannon index is used to find diversity of a species or genera within a certain environment. The Simpson index is used to find proportional abundance within a given area. Alpha diversity is the diversity at one site and beta diversity is the difference in diversities between sites. The values calculated from these indices can be used to assess ant biodiversity within Rowan County.

1:30 - 2:30 p.m. Integrated Electric Control Board With Relay Ladder Circuit And Plc Units

ℙ–10

***Alexandre LeMaster*. Dr. Qingzhou Xu, mentor,* School of Engineering and Computer Science, Smith College of Business and Technology**

Technologies and practices in industry are continuously evolving. In the 21st century, manufacturing has become more automated and computerized, and programmable logic controllers (PLCs) play a central role in automation in today's world. Although fluid power offers distinctive advantages over other force/torque-generating technologies, its full potential can only be harnessed when it is combined with other technologies; among which electric control is the most important.
In this project, an integrated electric control board will be developed. It consists of a relay ladder circuit unit and a PLC unit. The relay ladder circuit unit is comprised of selector switches, push-button switches, different types of relays, light indicators, and a DC power source. The PLC unit is composed of selector switches, push-button switches, light indicators, a MicroLogix controller, a computer, and a DC power source. The two units mentioned will share similar components wherever possible. The integrated electric control board is mounted with easy plug-in sockets and can easily be interfaced with pneumatic/hydraulic circuits. Both the relay ladder circuit unit and the PLC unit will be used to control the operation of the pneumatic/hydraulic power systems. The primary goal in building an integrated relay ladder logic control and PLC board is to provide students digestible knowledge by which relay ladder logic is used in automatic control through hands on learning which utilizes real devices and hard-wired connections. This learning device will greatly help students understand PLCs as ladder logic is the primary programming language used with PLCs. Many different relay ladder circuits and PLC ladder logic circuits will be presented and demonstrated to students to reinforce their understanding. After students understand the PLC ladder logic diagrams, they will be better equipped to learn and understand other PLC languages.

1:30 - 2:30 p.m. Virtual Reality Environment Of Excavator Training For Operation License

ℙ–11

***Victoria Russ*. Dr. Jorge Ortega-Moody, Dr. Kouroush Jenab, mentors,* School of Engineering and Computer Science, Smith College of Business and Technology**

In 2018 unfilled construction worker jobs rose to 404,000[1]. This was an all-time high, according to the Bureau of Labor Statistics Job Openings and Labor Turnover Survey. The government has no restrictions for operating an excavator; however, it is impossible to get a job without any operation and competency documentation. For this documentation, an employer could be looking at about $1000 for the most highly recognized training, which must be reinstated every five years. Excavation operation is a highly sought-after profession, and jobs are expected to rise by over 10% until 2028. The NSF EPSCoR research project is creating a Virtual Reality environment that will allow both residential and commercial jobs to train and teach employees how to operate excavators safely and competently. The Virtual Reality scenario will also allow employers to reduce the cost of operation and competency training. As a result, several workplace scenarios have been developed that can fully amerce an excavator operator into their training and safety.

1:30 - 2:30 p.m. **Through The Eye Of The Beholder: Student Teaching In Kentucky During A Pandemic**

ℙ–12 ***Brittany Stidham*. Dr. Kimberely Nettleton, Dr. Sandra Riegle, mentors,*** **Department of Middle Grades and Secondary Education, Volgenau College of Education**

Student teaching is the capstone of student teaching preparation. The Covid-19 pandemic has changed many aspects of student teaching; and students have had to adapt to a new way of both learning and teaching. As the world turned upside down, student teachers were expected to interact with their students and provide instruction. The pandemic caused student teachers to develop new ways to engage lessons and hold conversations in a virtual environment. This pilot study examines the ways in which a small group of student teachers in eastern Kentucky internalized their experience.

Asynchronous **"The Never Ending Story:" Circularizing Ch. Viii In Saccharomyces Cerevisiae**

ℙ–13 ***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, the free 3' ends 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 enzymes, we can still lose telomere sequences as we age. If linear chromosomes create issues not found with circular chromosomes, this begs the question of why did eukaryotic chromosomes evolve to be linear?
To address this broad question, we are genetically engineering a eukaryote with circularized chromosomes. We chose the yeast Saccharomyces cerevisiae, which is a single-celled organism with 16 chromosomes that can exist as a haploid containing a single copy of each chromosome. To create yeast with a circularized chromosome, we insert DNA cassettes that contain 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. To date, I have successfully built both left and right arm cassettes for Chromosome VIII using PCR. I am currently testing several candidates for proper integration of the DNA cassette into the left arm. If successful, I will work to integrate the second right arm cassette into these yeast. Ultimately, successfully circularizing a eukaryotic chromosome will allow us to explore big questions in eukaryotic chromosome evolution.

Asynchronous **A Portable Analyzer For Rapid And Sensitive Protein Detection By Ac Electrokinetics Capacitive Sensing**

ℙ–14

***Allie Skaggs*. Dr. Cheng Cheng, mentor,* School of Engineering and Computer Science, Smith College of Business and Technology**

Capacitive bioparticle detection is a promising method for point-of-care diagnosis. There are a wide range of applications for such a device: diagnostics, pharmacology, and medical science. The end goal of this project is to develop a portable capacitive sensing platform for rapid and sensitive bioparticles detection. When bioparticles bind to receptors located on the surface of the electrode there would be a change in the interfacial capacitance, which indicate the presence of the bioparticle. The ADuCM355 – a precision analog microcontroller with a chemical sensor interface – is being used to perform biased electrochemical impedance spectroscopy (EIS). An AC potential is applied across the electrodes at varying frequencies, and the resulting current is measured and transferred to a master device. The ADuCM355 is controlled via the serial peripheral interface (SPI) by a master device. While multiple microcontrollers are compatible with the ADuCM355, currently a mbed lpc1768 acts as the master device receiving data to be decoded and displayed. In the future multiple sensors can be connected to a single master device and take concurrent readings for more accurate sensing. The main requirements for the device are portability, affordability, and the ability to provide appropriate and adjustable AC signals.

Asynchronous **A Study Of Cauti's**

ℙ–15

***Abigail Bray*, Dakota Brown, Katelynn Arnett, Mary Bott*, Zachary Mains. Dr. Suzi White, mentor,* Department of Nursing, College of Science**

There are estimated to be 449,334 CAUTI events per year. A thorough literature review yielded nine studies on the topic of hospital acquired CAUTI's and the following themes emerged: Lack of education regarding catheter protocol and safety, the increased cost associated with CAUTI's, and how catheters are implemented before less invasive procedures. A quality improvement project was completed that included the following to be shared with clinical staff: the development of increased in person training, assessing the patient's continence status and urge to void, implementing bladder training interventions, and consistent perineal care and evaluation.

Asynchronous **Analytical Method Development For The Analysis Of Biomass Degradation Products**

ℙ–16 ***Calista Dean*. Dr. Emma Schmittzehe, mentor,*** **Department of Biology and Chemistry, College of Science**

The goal of this project is to study the kinetics of hydrothermal liquefaction of biomass. Biomass contains stored chemical energy that can be converted to renewable liquid and gaseous fuels through various processes, but an in-depth understanding of the kinetics of these processes is important in order for them to be feasible on a large scale. Since biomass degradation products depend on the type of biomass used as well as the reaction conditions, this task can be quite complicated. To minimize complications in our initial studies, we will use D-glucose as the starting material. To better understand the degradation pathway's dependence on reaction conditions, qualitative and quantitative analysis will be done on the products of hydrothermal degradation of D-glucose after various reaction times and conditions. However, the appropriate analytical techniques must be identified and tested first to ensure they are capable of identifying and quantifying biomass degradation products. The analytical techniques tested for this analysis include nuclear magnetic resonance (NMR), gas chromatography-mass spectrometry (GCMS), and high performance liquid chromatography (HPLC).

Asynchronous **Backyard Bio Security: How Social Media Bridges The Gap Between Urban Chicken Farmers**

ℙ–17 ***Carrie Sorrell*. Dr. Morgan Getchell, mentor,*** **School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

Urban chicken farming, defined as the practice of keeping a small flock of chickens in an urban or suburban setting for the purpose of this study, has increased in popularity in recent years. The purpose of this study is to examine how well-equipped urban chicken farmers are to care for their chickens, where they get information from, and how they judge that information to be credible. Specifically, the research looks at two diseases, Highly Pathogenic Avian Influenza (HPAI) and Virulent Newcastle disease, and whether these urban farmers know about the diseases and can deal with them appropriately based on the information they have gathered during their time farming. Semi-structured interviews that lasted approximately 20 – 30 minutes were conducted from a convenience sample of famers gathered from online posts. The results of the research seem to be that urban chicken farmers primarily use their chickens for eggs and teaching children about "real food." The chickens are typically seen more as pets than livestock animals, with only a small portion of people understanding the effects of HPAI and Virulent Newcastle disease. As for information gathering, social media is a key source for these urban chicken farmers, though they tend to stay skeptical of the information found on social media sites. Local vets and extension offices are a trusted source of information. Overall, urban chicken farming is growing in popularity, however, to help urban chicken farmers to understand fully the bio-security needs of chickens and overall healthcare, social media should be a primary source where the USDA shares content in relation to this topic.

Asynchronous **College Students' Understanding Of Analog Time Keeping And Rotational Directionality**

ℙ−18

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

Although time-telling using analog clocks is a topic covered in KY math standards in 1st and 2nd grades, and most older adults assume that everyone can read analog clocks, recent media reports and personal anecdotes have indicated that an ever-increasing proportion of young people struggle to correctly read them because most timing devices they are exposed to are digital. Although the personal and academic consequences of not mastering this skill are unknown, it is important to document the extent of this issue at a college level. Of particular interest to the researchers is the description of rotational direction as clockwise and counterclockwise (CW/CCW), which is commonly used in STEM disciplines and daily life. The purpose of this study is to document college students' understanding of correctly reading analog clocks and using CW/CCW directions. The first phase of this study is for the participants to complete an anonymous 5-minute survey with nine analog clocks for identifying the time and six circular diagrams for applying CW/CCW motions. This survey will be completed by a sample of about 100-150 college students enrolled in Morehead State University. The statistical analysis will be both descriptive and inferential; performance in time-telling and using CW/CCW directions will be compared based on the participants' gender, college rank, prior experiences with analog clocks or wristwatches. Also, a possible correlation between time-telling and using CW/CCW directions will be examined.

Asynchronous **Comparing Growth Of Mutant Strains Of Acinetobacter Baumannii To Wild Type After Treatment With Mitomycin C**

ℙ–19

Kaylee Compton*. Dr. Deborah Cook, Dr. Janelle Hare, mentors, **Department of Biology and Chemistry, College of Science**

In Acinetocbacter baumannii bacteria, an error-prone DNA damage repair response is induced by the self-cleavage of the UmuDAb protein. Previous experiments indicating that a ddrR mutant becomes growth sensitive after DNA damage suggested that ddrR is also involved in this process. To explore this relationship, eight mutant strains of A. baumannii were made with different combinations of mutations in either ddrR and/or the adjacent gene, A1S_3662. Our experiment compared the growth of wild type cells to strains containing various mutations: DC4 (no gene mutations, just an antibiotic resistance marker, Kanr), DC5 (stop codon mutation in ddrR), and DC6 (both the Kanr and the ddrR stop codon). The objective of this experiment was to compare viable colony forming units (CFUs) per mL between strains after treatment with DNA-damaging mitomycin C (MMC). This data allowed for the growth sensitivity between strains to be numerically compared. Serial dilutions were made from overnight cultures for each strain, and spots of each dilution were plated onto LB plates. The plates were incubated overnight, after which the colonies in each spot were counted and the CFU/mL was calculated for each strain, with and without MMC treatment. Our results from strains DC4, DC5, and DC6 suggests that the Kanr gene inserted into the DC4 strain hinders growth more than the ddrR stop codon present in DC5 and DC6. This was observed in both treated and untreated DC4 strains. Although the DC4 colonies were smaller, they were more numerous than the other strains. These experiments will help identify the extent to which these genes may participate in the growth response after DNA damage in this opportunistic pathogen.

Asynchronous **Data Acquisition For Physics With Arduino**

ℙ–20

Kyle Litton*. Dr. James Adkins, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

Arduino is an open-source electronics microcontroller board that allows us to marry technology with our environment. There are countless modules commercially available that can be easily manipulated with programs written in the Arduino Integrated Development Environment (IDE), giving users full control of input and output. Several of these modules naturally relate to physics and data acquisition. Since physics analyses rely on data, the Arduino is a natural choice for a system where the user has full control of data collection methods. This poster will present our development of a data acquisition system that integrates equipment commonly found in physics laboratories. We will discuss the electronics and software aspects as well as the role of the system in enhancing student understanding of computer programming.

Asynchronous

Effects Of Hyperbaric Oxygen Therapy On Intraocular Pressure In Dogs

ℙ−21

Sierra Ott*. Dr. Lauren Mirus , mentor, **Department of Agricultural Sciences, College of Science**

Hyperbaric oxygen therapy (HBOT) is a method in which pressurized oxygen is used to improve oxygen delivery to tissues. This treatment has been found to be effective in a variety of disorders in human and animal medicine, however it is underutilized in small animal medicine, in part because veterinary professionals may not be adequately familiar with how it works and when it is worthwhile. There has been hesitancy to utilize this method of treatment due to the fear of the unknowns, one example being a potential for an increase in intraocular. The mission of this project was to expand knowledge of HBOT treatment and also determine the effect of increased oxygen pressures on the internal aqueous pressure in the anterior chamber of the eye to identify any negative effects that there could be on the canine eye. Patients in this study underwent hyperbaric oxygen therapy for a specific condition that was recorded and did not receive unnecessary treatments. Each participant had a complete physical examination performed by a licensed veterinarian to assure that there was not underlying pathology that would contraindicate HBOT and patients were not selected to participate if they had a known underlying ocular condition. For this study, eighteen dogs were subject to hyperbaric oxygen therapy and were treated with 100% oxygen at a pressure of 14.7 PSI for 30 minutes. Overall treatments lasted approximately 60 minutes, allowing roughly 15 minutes to achieve 14.7 PSI and roughly 15 minutes to decompress after the treatment to avoid barotrauma. Intraocular pressures were obtained using an Icare® TONOVET Plus Tonometer and the chamber that was utilized in this study is a Companion Animal Hyperbarics, LP chamber. Patient intraocular pressures were measured immediately prior to HBOT and immediately after. A single credentialed veterinary technician was responsible for obtaining each intraocular pressure reading in order to ensure that there was no discrepancy amongst individuals. Due to the nature of the treatment being within an enclosed chamber, intraocular pressures were not taken during the treatment. Analysis of results compared an increase or decrease in post-HBOT intraocular pressure compared to pre-HBOT readings. Results of this trial suggest that there is no clinically significant impact on intraocular pressure in patients receiving hyperbaric oxygen therapy.

Asynchronous **Ekap Update: Rethinking The Presentation Of Historic Sites**

ℙ–22

Elizabeth DeBord*. Dr. Joy Gritton, mentor, **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

The Eastern Kentucky Art Project was founded in 2007 as a way to connect communities with resources pertaining to visual arts and music in Eastern Kentucky. One significant type of resources EKAP features is information regarding historic architecture in Eastern Kentucky. Understanding cultural landmarks in people's own communities can foster an inclusive and healthy community identity, but it became clear through recent efforts to update the EKAP website that information surrounding the preservation of historic sites is often difficult to access and understand for a general audience. Previous efforts to educate and encourage preservation of important sites was often tied to lengthy reports or only available through difficult to navigate government websites. Modern media, specifically social media, provides a novel opportunity to present historic preservation in a way that is engaging for diverse populations in today's digital world. Social media also offers the possibility of storytelling that more static forms of media cannot. To successfully continue to preserve historic sites in a way that benefits communities, historic preservation practices must become not only more understandable, but also appealing to a wider audience. This presentation demonstrates best practices for making this vital information accessible in ways that are relevant and allow preservation to become a true passion for broader audiences, empowering communities to learn about and preserve their own unique history.

Asynchronous **Evidence Based Evaluation Of A Ventilator Management Clinical Practice Protocol**

ℙ–23

Kyle Mills*. Dr. Michelle McClave, mentor, **Department of Nursing, College of Science**

Nursing care and management of mechanically ventilated patients requires specific care elements to be achieved in order for optimal patient outcomes. The ventilator management policy guides nursing care for this select group of patients. The ventilator management policy of a rural community acute healthcare facility was evaluated for evidence-base and validity using the AGREE GRS rating scale. The evaluation process included interview of the director of the inpatient unit responsible for care of ventilator patients, as well as review of the most current evidence-based practice protocols. Evaluation results indicate the facility's policy met the needs of the patients, and incorporated the most up-to-date clinical recommendations.

Asynchronous

Genetically Screening For Gain Of Function Mutations In Telomerase Rna

ℙ−24

Jose Childers*. Dr. Melissa Mefford, mentor, **Department of Biology and Chemistry, College of Science**

Jose Childers and Dr. Melissa Mefford

Telomeres are DNA structures located at the ends of linear chromosomes. They function, in part, to allow DNA ends to be copied before cells divide. Since the standard DNA replication machinery can't fully copy telomeres, most eukaryotic cells require the vital ribonucleoprotein enzyme telomerase. Telomerase is composed of a TERT (telomerase reverse transcriptase protein) and telomerase RNA. As we age, telomeres shorten since most human cells do not express telomerase. If telomeres grow too short, it triggers a cell-cycle arrest known as senescence, which can ultimately result in cell death. On the other hand, >85% of human cancers show over-expression of telomerase, which is required for the uncontrolled cell division that is a hallmark of this disease. Interestingly, despite the importance of telomerase RNA, its structure and function is not well understood. To shed light on the correlation between telomere length and telomerase RNA structure, we devised a genetic screening strategy using the yeast Saccharomyces cerevisiae to identify novel gain-of-function (GOF) mutations in telomerase RNA. First, we transform a library of random telomerase RNA mutant plasmids into yeast. Then, we select for yeast that appear to have longer telomeres using a selectable marker in a sub-telomeric region. Finally, we rescue the plasmids and send them for sequencing to determine the mutations. To date, I have screened ~1000 colonies and identified ~10 putative GOF alleles. I am currently working to identify the mutations present in the putative GOF alleles. Identification of more active versions of telomerase RNA could ultimately lead to an understanding of enzyme function that lengthens telomeres and decreases the rate of aging.

Asynchronous **Growth Performance Of Weaned Angus Bulls Housed In A Compost Bedded Pack Barn**

ℙ–25

Anna Meyers*, Courtney Branham*. Dr. Flint Harrelson, Dr. Patricia Harrelson, mentors, **Department of Agricultural Sciences, College of Science**

Compost-bedded pack barns (CBP) are a typical facility utilized in dairy cattle operations across the United States. Their popularity is the result of improved animal welfare and reduced costs. The crossover of CBP into the beef cattle industry is new and the benefits and downfalls are not yet explored. Through a grant from NRCS, a CBP was built at the Derrickson Agricultural Complex in 2019-2020. In fall of 2020, the pack was established by mixing manure and sawdust shavings to start the aerobic composting process and weaned bulls were given access to the barn in November 2020. The objective of our study was to determine the performance of growing bulls utilizing a CBP compared to a fully outdoor pasture housing system. Growth data from 2 consecutive years of growing bulls were utilized, with calves born in 2019 being used as a control (CON) group and calves born in 2020 being used as the CBP group. Adjusted weaning and yearling weights reported to the American Angus Association were utilized to measure growth performance. In order to limit the potential bias due to genetics, data for the heifers born in both years were also evaluated as an outside standardization mechanism. Weaning weights for CON and CBP bulls were similar ($P = 0.45$), though interestingly the corresponding heifer calves weaned with CBP bulls were heavier ($P < 0.01$) than those weaned with the CON bulls. Bulls housed in the CBP were significantly heavier ($P < 0.01$) as yearlings compared to the CON bulls (1092 lbs vs. 935 lbs, respectively). Our results suggest that utilizing a compost bedded pack barn during the winter growing phase may be beneficial to the producer by increasing growth potential of weaned calves.

Asynchronous **Improving Patient Outcomes With High Nurse To Patient Ratios: A Quality Improvement Study**

ℙ–26

Abigail Ross*, Alexis Bradshaw*, Brenna Murphy*, Carson Jones*, Cierra Connelley*, Haley Nyderek*, Hannah Dorton*, Morgan Minton*. Dr. Mary Suzi White, mentor, **Department of Nursing, College of Science**

According to the United States Registered Nurse Workforce Report Card and Shortage Forecast: A Revisit published in the May/June 2018 issue of the American Journal of Medical Quality, a shortage of registered nurses is projected to spread across the country between 2016 and 2030. Surveyed nurses see the shortage in the future as a catalyst for increasing stress on nurses (98%), lowering patient care quality (93%) and causing nurses to leave the profession (93%) (American Association of Colleges of Nursing, 2021). A thorough literature review was conducted, and 40 studies were reviewed. Common themes that emerged include: high nurse to patient ratios increased the risk for hospital acquired infections, higher levels of understaffing are associated with higher mistreatment rates, and there is a decrease in patient outcomes associated with nurse understaffing. A set of guidelines have been developed to assist the nursing staff during a shortage of nurses or nursing technicians.

Asynchronous **Increasing Student Engagement In Introductory Physics Hybrid Classes**

ℙ–27

Breanna Epperson*. Dr. Kent Price, mentor, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

The demand for online instruction is on the rise. In a classroom setting, research shows that student interactions are important for overcoming common misconceptions, but it is challenging to achieve the same level of engagement in an online setting. To try to improve online interactions in a hybrid physics class at Morehead State University, the Fall 2020 online class was required to post a total of three times about a closed, multiple choice, conceptual physics question in each assignment while following certain criteria. In the Spring of 2021, the discussion format was kept the same, but was moved to a different interface and included open, written response, rather than closed questions. The results from this change are being measured by comparing the amount of engagement for each student and the number of students who eventually obtain the correct answer.

Asynchronous **Kentucky Soldiers At The Battles Of Frenchtown And The River Raisin Massacre**

ℙ–28

Christian Wright. Dr. Adrian Mandzy, mentor, **School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

Research on The War of 1812 has been sporadic over the last two hundred years. In spite of the two centuries which have passed, significant gaps in the scholarship remain. Most individuals recognize that Kentucky troops played a major role in the war, but their participation and the number of casualties they suffered remains speculative. American newspaper accounts of the period, written with an eye to sell more copies, may not be accurate as they historically over inflated the number of dead. At the same time, British accounts have a tendency to downplay the numbers of American troops involved for their own political reasons.

Working with Dr. Adrian Mandzy on an ongoing research project about the War of 1812, we focused our attention on the number of Kentucky troops involved in the January 1813 River Raisin Massacre and the October 1813 Battle of the Thames. Using pension requests, the published 1891 Kentucky National Guard Adjutant Generals Report, and a document found within the Draper Manuscript Collection (documents collected by Lyman Draper in the mid-19th century), we were able to calculate the approximate numbers of Kentuckians who fought and died at this engagement. Once we complete our research, we hope to publish our findings in the Journal of America's Military Past.

Asynchronous **Listen To Your Heart: Promoting Traditional Music In The Schools Of Appalachia**

ℙ–29 ***Cera Clark*. Dr. Joy Gritton, mentor,*** **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

Appalachian culture has many distinguishing features, one of those being the traditional music that has endured generations. Fostering traditional music in the region's schools could help keep that heritage alive. While there are multiple programs that have worked to promote traditional music in Appalachia's public schools, many systems have found the cost of visiting artists, instruments, and field trips out of reach with increasing budget cuts. The past year presented additional problems, as many schools have been forced to turn to alternative delivery systems for education that rely heavily on technology. Organizing a series of instructional videos, featuring local instructors and musicians who are all masters of their craft, could increase the accessibility of regional music instruction, while promoting an inexpensive way for Appalachian youth to learn more about their musical heritage. This presentation, drawn from interviews with those working in the field and a survey of online resources, displays the need for more accessible traditional music instruction and explores strategies for nurturing traditional music instruction among children in the region.

Asynchronous **Miscommunication Among Healthcare Professionals In The Hospital Setting: A Quality Improvement Project**

ℙ–30 ***Benjamin Hutchinson*, Carrie Conley *, Courtney Collins*, Erin Downey*, Jordan Jenkins*, Lorren Sales*, Makayla Canchola*, Savanna Roades*. Dr. Suzi White, mentor,*** **Department of Nursing, College of Science**

Research has identified that 81% of interruptions during handoff were from the nurse receiving handoff(Rhudy, L., Johnson, M., Krecke, C., Keigley, D., Schnell, S., Maxson, P., McGill, S., & Warfield, K., 2019). Miscommunication in the healthcare field is a considerably large issue. It often times goes unmentioned, which can negatively impact patient's care. A thorough literature review was conducted and a total of 64 studies were reviewed. Common themes that emerged included language barriers and cultural differences can often be associated with miscommunication in the healthcare setting. With miscommunication and the errors that result from it, trainings and policies have been made in order to reduce the incidence from happening. These include things like teamwork enhancement and communication trainings

As a result of this literature review a guideline handout was created to illustrate the SBAR (Situation, Background, Assessment, Recommendations) technique for handoff in order to improve how healthcare providers will communicate information about the patients. This guideline will be shared with clinical faculty. The expected results will show an improvement in the communication among healthcare professionals, which will also improve patient outcomes. Miscommunication must be addressed by every and all members within a healthcare setting in order to try and eliminate errors.

Keywords: miscommunication, communication, healthcare professionals, hospital, patient outcomes, SBAR handoff

Asynchronous

Photography Practicum: Learning The Basics Of Managing A Fine Art Photography Studio

ℙ–31

***Brooklin Routt. 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 twelve-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.

Asynchronous

Preliminary Study On Beetle Biodiversity And Its Role As A Metric For Ecosystem Heterogeneity In The Rowan County Area

ℙ–32

***Belinda Candra*, Sara Monfalcone*. Dr. Charles Lydeard, Dr. Sean O'Keefe, mentors,* Department of Biology and Chemistry, College of Science**

Biodiversity is important for maintaining ecosystem function, including the adaptation of the organisms to reflect the change in the ecological community. Many ecological roles are performed by insects, including keystone organisms, ecosystem engineers and soil modifiers, part of the food chain, general symbionts, and pollinators, and creating a cumulative database of the variety of insect types allows for an effective overview of the different aspects of the environment from which samples are collected. With approximately 400,000 described species, beetles are immensely diverse in their lifestyles and ecological roles, thus making them valuable tools in environmental assessments of terrestrial and freshwater ecosystems. It also means that they provide a robust set of data for metrics of biodiversity. This preliminary study focuses on ground beetles, which are important as bioindicators of habitat conditions and ecosystem heterogeneity, in Rowan County, Eastern Kentucky across three locations. Methods of quantitatively collecting samples include light traps, pitfall traps, leaf sifting, and pan traps. The primary method used in this study was leaf sifting and Berlese funnel, which is used to extract small insects and arthropods from leaf litter and other debris. Collected data are often analyzed using statistical analysis (ANOVA) that emphasizes the abundance of individuals, functional analysis that explores the diversity of different functional groups, or through various indices, including the Simpson and Shannon indices, that measure the richness and abundance of species.

Asynchronous **Preservation Of Morehead State History**

P–33

***Jacob Bush*. Dr. Alana Scott, Mr. Dieter Ullrich, mentors,* School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

This project is being undertaken in an effort to preserve the buildings and history of Morehead State University. It is the goal of this project to make additions to the historic district of MSU by adding qualifying buildings to the National Register of Historic Places. By adding buildings to the Register, they would be recognized on the federal level as historic sites and receive support for their preservation. The Register seeks to protect sites of importance through many ways including the gifting of funding to ensure preservation. The goals of this project will be achieved using historical texts from our university including presidential papers, Student Government Administration documents, construction files, and other credible resources. Using these will lead to an application to the Register if the project is approved by the MSU Administration.

Asynchronous **Preventing Needle Stick Injuries: A Quality Improvement Project**

P–34

***Adrianna Kerns*, Emilea Pitts*, Grace Richman*, Katie Rawlings*, Megan Riley*. Dr. Mary Suzanne White, mentor,* Department of Nursing, College of Science**

"Needlestick injuries (NSI) affect approximately 1,000 people per day across U.S. hospitals. Needlestick injuries cost an estimated $3,042 per victim annually, according to the report. The costs go toward laboratory fees for testing exposed employees, associated labor and counseling and post-exposure follow-ups." (Beckner's Clinical Leadership & Infection Control, 2020). It was noted at an urban teaching hospital that needlestick injuries are an issue. Researchers believe this number is an underestimate of the actual amount of needle stick injuries. The purpose is to increase the education of staff nurses on the topic of needle stick injuries. We thoroughly reviewed 56 studies to gather information for preventing needlestick injuries. 15 studies were cross sectional, 1 was methodological, 5 were meta-analyses, 6 were experimental, 3 correlational, 7 were descriptive, 1 was a prospective survey, 1 retrospective analysis, 1 systematic literature review, 4 exploratory, 7 phenomenological, 5 quasi-experimental. Common themes identified were nurses are the most likely to have needlesticks out of healthcare workers, education and training was the prevention strategy most likely to prevent needlesticks, safety devices once educated on decreased needlesticks, most common factor that causes this is burnout and stress, most are not reported so the actual number is underreported, and the need to get tested for disease transmission after.

Asynchronous **Relation Among Potential Predictors Of Drug Abuse Risk In Rats**

ℙ–35

***Emma Brock*. Dr. Wesley White, mentor,* Department of Psychology, College of Science**

Animal models have been used to investigate behavioral processes and mechanisms that underlie addiction. A variety of measures have been developed for rats that are modest predictors of drug abuse risk. The purpose of this pilot study was to begin to assess whether several established and potential measures of drug abuse vulnerability were correlated. The subjects were eight adult male Wistar rats. The rats were run on procedures that yielded measures of anxiety, sensation seeking, short term responsive to acutely administered drug, and sensitivity to conditioned stimuli. These measures were correlated with a potential new measure of drug abuse vulnerability—withdrawal from acutely administered drug. All measures produced considerable individual differences. The pattern of trends in correlations provided some evidence that withdrawal from acutely administered drug may be a predictor of drug abuse vulnerability. The possibility that the withdrawal measure may be a novel drug-vulnerability phenotype deserves further study.

Asynchronous **Role Of Apolipoprotein E In Parkinson's Disease**

ℙ–36

***Georgia Clark*. Dr. Ilsun White, mentor,* Department of Psychology, College of Science**

Parkinson's disease (PD) is a common neurodegenerative disease that affects more than 10 million people worldwide. PD is a movement disorder, which causes tremor, rigidity, bradykinesia, and postural instability. Although PD is characterized by degeneration of dopamine neurons in the substantia nigra, the precise cause of degeneration or loss of dopamine neurons is unknown. Studies suggest that specific gene mutations and environmental factors may trigger PD. Other studies suggest that abnormal accumulation of alpha-synuclein may cause degeneration of dopamine neurons, and that Lewy bodies which contain alpha-synuclein are a histological hallmark of PD. Recent studies suggest that high levels of Apolipoprotein E (ApoE) in the cerebrospinal fluid (CSF) may serve as a biomarker of PD. ApoE is the most abundant protein for lipid transport in the brain and a subtype, ApoE4, is also linked to Alzheimer's disease. The present study reviewed the reliability of ApoE as a biomarker of PD and the role of ApoE in accumulation of alpha-synuclein. Hypothesis was two-folds: (1) ApoE level in the CSF is a reliable biomarker of PD; (2) ApoE contributes to the spread of alpha-synuclein in PD. Conclusion: Significantly high levels of ApoE in CSF and in the substantia nigra were shown in PD patients. This suggests that ApoE in CSF can serve as a reliable biomarker, and that ApoE in the substantia nigra as an additional biomarker. In PD, ApoE increased alpha-synuclein aggregation through alpha-synuclein's high binding affinity for ApoE-containing vesicles. This suggests that ApoE contributes to the spread of alpha-synuclein in PD. Further research is warranted.

Asynchronous **The Editorial Process Of The Kentucky Philological Review**

ℙ–37

***Jalyn Findley*, Olyvia Neal*. Dr. Karen Taylor, mentor,* School of English, Communication, Media and Languages, Caudill College of Arts, Humanities and Social Sciences**

The Kentucky Philological Review (KPR) is the official journal of the Kentucky Philological Association, published annually. This journal contains essays, book reviews, and creative work selected by the Editorial Committee from the Best of Section papers presented during the prior year's spring conference. These submissions are then edited by this committee and editorial assistants through MLA format, grammar, syntax, and overall cohesion of themes by correspondence with the authors throughout the year.
As editorial assistants of the KPA Editorial Committee, we attended the 2020 KPA conference, organized contact information from the presenters, and began initial readings of their papers and creative work. After the Editorial Committee finalized their decisions on the next volume's selections, we began the process of editing and commenting on each piece through weekly meetings with the Editor, Dr. Karen Taylor. Our comments referenced consistency and proper MLA Format, structure and syntax, clarity of theses, and general perspectives of the reader. These comments were then compiled and sent to the authors, where the needed corrections would be made. Once assembly of the KPR began, we proofread the journal's draft in its entirety until it was ready for final publication.
Through this editorial process we were able to gain not only a comprehension of MLA format throughout various forms of literature but also a better understanding of how to communicate ideas effectively within an academic community, the necessity of thorough research when writing a body of work, and the importance of revision and critique.

Asynchronous **The Effect Of Utilizing An Electronic Medication Administration Record: A Quality Improvement Study**

ℙ–38

***Ally Sipple*, Branden Workman*, Caitlyn Smith*, Megan Smith*, Rebecca Werring*, Shayenne Slone*, Taylor Stroud*, Victoria Thomas*. Dr. Suzi White, mentor,* Department of Nursing, College of Science**

The suspected cost of medication errors in clinical practice is an annual $1.69 billion dollars. A thorough literature review of a total of 64 studies were reviewed. Common themes that emerged were barcode administration errors greatly reduces medication errors, that electronic records greatly reduced the severity of adverse effects, a lack of communication between medical staff results in more errors in medication administration, and the use of an electronic record reduces workload and stress on the nurses administering the medications. As a result of this literature review, an intervention was developed utilizing the importance of electronic records on reducing medication errors that will be shared with our clinical faculty.

Asynchronous **The Effects Of Nurse's Mental Health On Quality Patient Outcomes: A Quality Improvement Study**

P–39

Alexandria kincaid*, Mara Walker*, Mila Osborne*, Tiyanna Jones*, Victoria Clevenger*. Dr. Suzi White, mentor, **Department of Nursing, College of Science**

Morale among nurses is declining rapidly, this could be due to the rising mental illnesses like anxiety, depression, chronic fatigue, stress, worry and post-traumatic stress disorder. Not to mention the rate of suicide in female nurses is 11.97/ 100,000 compared to non-nurse females having a rate of 7.58/ 100,000. Also, male nurses have an incidence of suicide at a rate of 39.8/ 100,000 compared to non-nurse males at 28.2/ 100,000. A thorough literature review was conducted and a total of 40 studies were reviewed. Common themes that emerged were "A decrease in nursing staff retention related to low satisfaction, lack of resources, unfair compensation, and lack of communication," "the higher that staffing levels are, the better clinical outcomes and the better the patient's experience is," "frontline health care workers are at an increased risk for suffering from mental illness which directly affects work performance, patient care and outcomes, and life outside of work." An important conclusion showed that a nurse's mental health status affects the quality of patient care and positive outcomes. As a result of this literature review an intervention was developed in the form of workshops for different coping strategies, stress and other information for support/ discussion groups that could be provided to nursing staff.

Asynchronous **The Impact Of Music On Recreational Exercisers**

P–40

Rachel Rodgers*. Dr. Gina Gonzalez, mentor, **Department of Kinesiology, Health and Imaging Sciences, College of Science**

Music is thought to have positive psychological effects and is oftentimes used as an aid during exercise. However, it is unclear whether the use of music affects a persons' exertion rate, enjoyment, and performance during moderate intensity running. In order to examine this relationship, a small-scale pilot study was performed to evaluate methods for the full-scale project. Currently, the full-scale study is being conducted and will include 30 participants, ages 18-25, who self-identify as recreational runners, and answer "no" to all questions on the Physical Activity Readiness Questionnaire. Participants will perform two trials of running one mile on an indoor track at a moderate pace, defined as 12-14 on the Borg Rating of Perceived Exertion Scale. One trial will be performed with their preferred music and one trial with no music. Data collected will include average running pace at half a mile and one mile, heart rate at rest and at the end of one mile, tempo and genre of the participants' chosen music, and their score from the Physical Activity Enjoyment Scale (PACES). Statistical analysis using SPSS version 26 will determine whether there is a difference in pace, heart rate, and PACES score between the two trials (music and no music). Both pilot experiment data and preliminary data from the full experiment will be presented.

Asynchronous **The Impact Of Power Yoga Training On Baseball Throwing Velocity**

ℙ–41 ***John Bakke*. Dr. Gina Gonzalez, mentor,*** **Department of Kinesiology, Health and Imaging Sciences, College of Science**

The purpose of this study was to examine the impact of yoga on baseball pitching velocity, and the factors that affect throwing velocity such as power, flexibility, speed, and mobility. Thirteen volunteer collegiate baseball pitchers were pre-tested on their power, flexibility, speed, mobility, and throwing velocity. The intervention included a 10-week yoga training, with the goal of three sessions per week. Participants were then post-tested under the same conditions. Analysis included dependent t-tests for each of the fitness assessments, with alpha set at .05 a priori. The group was unable to reach the goal of three yoga sessions per week, averaging 1.92 sessions per week with two participants surpassing the goal of three per week. There were three tests that improved significantly from pre-test to post-test: sit and reach test, v-sit test, and seated medicine ball throw test. The lack of a control group and inability to control other training factors such as weightlifting and baseball practice, led to difficulty isolating the benefits of the yoga program.

Asynchronous **Use Of Gas Chromatography Mass Spectroscopy To Study Hydroxyfulvenes**

ℙ–42 ***Ashley Stefani*. Dr. Mark Blankenbuehler, mentor,*** **Department of Biology and Chemistry, College of Science**

This project was conducted to determine the conditions necessary in Gas Chromatography Mass Spectroscopy (GCMS) for various hydroxyfulvenes. Several samples each having unique characteristics, such as high molar mass or specific functional groups, were used to determine the optimal conditions for each compound. Different GC parameters were varied including the inlet temperature, initial oven temperature and oven temperature ramp. Compounds were also studied at varying concentrations in order to determine the optimal conditions needed to produce reliable molecular ion data in the MS.

Asynchronous **Undergraduate Research Fellowship In Claypool Young**

ℙ–43 ***Saule Gollihue. Mr. Adam Yungbluth, mentor,*** **School of Creative Arts, Caudill College of Arts, Humanities and Social Sciences**

The research project will focus on learning the various activities involved in running a college level Sculpture & Ceramics Studio. For the Sculpture Studio, this will help allow access outside of class for other students and learning to maintain studio equipment. Also, for the Sculpture Studio this will provide extra guidance to students in Sculpture 1 while they are learning new equipment and tools. Activities for the Ceramics Studio will include clay mixing for Ceramics 1 courses.

Asynchronous

Multi Epoch Observations Of The Nearby Spiral Galaxy Ngc 6744 With The Chandra X Ray Observatory

ℙ−44

***Alanna Cavins*. Dr. Thomas Pannuti, mentor,* Department of Physics, Earth Science and Space Systems Engineering, College of Science**

We present an analysis of two archival pointed observations made of the nearby spiral galaxy NGC 6744 with the Chandra X-ray Observatory. Based on its grand design spiral arm structure and its comparable linear extent, NGC 6744 has often been considered a "twin" to the Milky Way galaxy. In addition, given its proximity and face-on orientation, it is a desirable target for the study of discrete X-ray source populations in galaxies like the Milky Way.

With its unsurpassed angular resolution of one arcsecond and its moderate flux sensitivity, Chandra is the ideal observatory to both detect discrete X-ray sources in nearby galaxies and to identify clear counterparts to these sources as detected at other wavelengths (such as optical and radio). We consider two observations made of this galaxy (each with effective exposure times of 50 kiloseconds) that were conducted two years apart. As part of this study, we have searched for time-variability in the X-ray emission from these sources between these two observations and -- using the combined dataset -- searched for X-ray counterparts to known discrete radio sources seen toward this galaxy. Initial results of this work will be presented and discussed.

Asynchronous **Tailored To The Times: Pro Se Divorce Clinic**

P–45 ***Kallie Hellard. Ms. Laken Albrink, mentor,*** **School of Humanities and Social Sciences, Caudill College of Arts, Humanities and Social Sciences**

Morehead State University partners with Legal Aid of the Bluegrass to provide the region with the Pro Se Divorce Clinic. Through the clinic, supervised students assist indigent clients with filling out the necessary paperwork to represent themselves and obtain a divorce. Without the help of the clinic, most clients would not be able to afford the cost to receive a divorce. Previous to COVID-19, the clinic was held once a month during the school year, serving an annual average of 70+ clients total (that number would be double if counting spouses). The supervised student coordinator manages all of the clinic's logistics from client referral to final decree.

Since the clinic is in-person, COVID-19 had halted them for the 2020-2021 year. In coordination with Legal Aid of the Bluegrass staff and the faculty mentor, the student coordinator worked to identify challenges and propose protocols for in person and virtual clinics during a pandemic. The student coordinator has reviewed cases for the past five years to identify any challenges to clinic efficiency (including analyzing common causes for delays). Through identifying those challenges, the student coordinator developed procedures for increasing clinic efficiency, including enhanced client communication. Challenges and considerations include the health and safety of clients and volunteers, the need for notarized signatures, the requirement that the Petitioner submit a deposition under oath, technological limitations for indigent clients, improving clinic efficiency and reducing delays, and more. The student coordinator created a proposed plan outlining options for both a virtual clinic and a clinic utilizing the new "Zoom Room" located at Legal Aid of the Bluegrass with a pilot Zoom Room clinic scheduled for April. These plans provide options for running the clinic in a safe manner while supporting the needs of the communities it serves. Finally, the student coordinator has created a survey to gauge clinic productivity and client satisfaction.

12:15 - 1:15 p.m. **Fungi In A Warmer World Fungal Diversity In The Tropical Middle Miocene Climate Optimum Forests Of Australia**

P–46 ***Jolene Fairchild, Jonathan Rose, Laikin Tarlton*, Savannah Jones, Tyler Spears. Dr. Ingrid Romero , Dr. Jennifer O'Keefe, mentors,*** **Department of Biology and Chemistry, College of Science**

Fungi are extremely important components of our environment; knowing fungal biodiversity provides key information about ecosystem dynamics, especially about carbon cycling. Here we present an overview of fungal biodiversity as recorded in 16.6-14.8 million year old lignite seams from the Gippsland Basin, Australia. This interval of time includes the Middle Miocene Climate Optimum (MMCO), a warm period that is a potential analog for understanding the impacts of modern climate change. All lignite samples are from the Yallourn Seam of the Latrobe Valley Group, and have been extensively studied using plant palynology, organic petrography, and stratigraphy to produce a detailed paleoecological record for the area across the MMCO. However, the fungi preserved in these coals have never been studied. Here we present the first overview of fossil fungal diversity from the Yallourn Seam. This study lays the foundation for predicting future fungal biodiversity in similar ecosystems during predicted modern climate change.

12:15 - 1:15 p.m.

Fungi In A Warmer World Fungal Diversity In The Tropical Middle Miocene Climate Optimum Forests Of Thailand

P–47

Charity Fairchild*, Jonathan Rose, Laikin Tarlton, Savannah Jones, Tyler Spears*. Dr. Ingrid Romero Valero, Dr. Jennifer O'Keefe, mentors, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

Fungi are excellent but under-utilized resources for understanding and predicting climate change. As heterotrophic organisms that rely on other organisms, especially plants, for nutrients, including carbon, their diversity is linked to overall ecosystem diversity. Fungi have high preservation potential in the fossil record due to their cellular composition, thus can be used to track past environmental and climate change, even when other microfossils are scarce. Here we explore fungal diversity preserved in coal samples from the Mae Moh Basin in Thailand, which were deposited during the Middle Miocene Climate Optimum (MMCO; 15-17 million years ago). We show how diversity changed through time, reflecting climate change associated with the MMCO, a period of past global climate change that is often used as a proxy for modern climate change.

12:15 - 1:15 p.m.

Analyzing Honey In Support Of The Kyhtl Launch – Identifying Tiny Pink Dots Is Harder Than You Think

P–48

Tera Kaplon*. Dr. Ingrid Romero, Dr. Jennifer O'Keefe, mentors, **Department of Physics, Earth Science and Space Systems Engineering, College of Science**

The Kentucky Honey Testing Laboratory (KYHTL) was launched in Fall 2019 and is supported by an initial grant from the Kentucky Department of Agriculture. Completion of the analyses of initial round-robin honey samples between Morehead State University and Bluegrass Community and Technical College was delayed by the onset of COVID, and are now nearing completion. Remaining, however, were some of the more interesting samples, clearly of unknown origin. Simultaneously, a complete turn-over in melissopalynology student researchers occurred at Morehead State University, and pollen identification skills had to be taught to the next generation before they could tackle the unknown. This poster presents the trials and tribulations encountered by a new analyst during identification of significant numbers of unknown pollen and outlines new guidance for identifying pollen from unknown sources.

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 2017-2018 awardees and their mentors.

CAUDILL COLLEGE OF ARTS, HUMANITIES AND SOCIAL SCIENCES

Student URF	Class	Department	Mentor(s)
Abigail Hall*	FR	SECL	Karen Taylor
Abigail Hall*	FR	SECL	Karen Taylor
Nicholas Anderson*	SR	SECL	Karen Taylor
Allison Jones*	JR	SCCA	Adam Yungbluth
Brooklin Routt	SO	SCCA	Robyn Moore
Carrie Sorrell*	SR	SECL	Morgan Getchell
Cera Clark*	SO	SCCA	Joy Gritton
Cheyenne Smith*	JR	SCCA	Joy Gritton
Dalton Black*	JR	SHSS	Jason Holcomb
Elizabeth DeBord*	SR	SCCA	Joy Gritton
Kelsey Ball*	SO	SECL	Katy Carlson
Elizabeth Keeton*	SR	SECL	Katy Carlson
Heather Smith*	JR	SCCA	Joy Gritton
Jalyn Findley*	SO	SECL	Karen Taylor
Olyvia Neal*	SO	SECL	Karen Taylor
Kallie Hellard	SR	SHSS	Laken Albrink
Kristen Daniel*	SR	SCCA	Thomas Pappas
Olivia Dale*	JR	SHSS	James Masterson
Saule Gollihue	JR	SCCA	Adam Yungbluth
Sinclaire Dorsey*	JR	SCCA	Melissa Yungbluth
Tayler Burnette*	JR	SCCA	Joy Gritton
Victoria Nash*	SR	SECL	Sylvia Henneberg

COLLEGE OF SCIENCE

Student URF	Class	Department	Mentor(s)
Megan Riley*	SR	NURS	Mary Suzanne White
Mila Osborne*	SR	NURS	Suzi White
Amber Schifano*	JR	BIOL/CHEM	Charles Lydeard Sean O'Keefe
Courtney Branham*	SR	AGR	Flint Harrelson Patricia Harrelson
Ashley Stefani*	SR	BIOL/CHEM	Mark Blankenbuehler
Courtney Smart*	SR	AGR	Amy Staton
Austin Spradlin*	SR	BIOL/CHEM	David Eisenhour
Erin Downey*	JR	NURS	Suzi White
Bethany Allen*	SR	AGR	Vijay Subramaniam
Blake Hoover*	JR	BIOL/CHEM	Melissa Mefford

Breanna Epperson*	JR	PHES	Kent Price
Tyler Spears*	JR	PHES	Ingrid Romero Valero Jennifer O'Keefe
Chisom Iloegbunam*	SO	BIOL/CHEM	Melissa Mefford
DeAnna Kidd*	SR	BIOL/CHEM	Allen Risk
Emma Gundler*	SR	PSY	Daniel Maitland
Griffin Newell*	JR	PSY	Shari Kidwell
Lauren Wright*	JR	PSY	Shari Kidwell
Jacob Lewis*	JR	PSY	Daniel Maitland
Reganne Miller*	SR	PSY	Gregory Corso
Reganne Miller	SR	PSY	Gregory Corso
John Fitzpatrick*	SR	PHES	Thomas Pannuti
Jose Childers*	JR	BIOL/CHEM	Melissa Mefford
Kayla Daulton*	JR	PSY	Daniel Maitland
Keaghan Knight*	JR	PHES	Joshua Qualls
Kyle Litton*	JR	PHES	James Adkins
Laura Cadwallader*	JR	PHES	Jennifer Birriel Kevin Adkins
Tiffany Hicks*	SR	PSY	Shari Kidwell
Nadia Richardson*	SR	BIOL/CHEM	Melissa Mefford
Nathan Sparks*	JR	PHES	Jennifer O'Keefe
Parker Poulos*	SR	PHES	Dirk Grupe
Rachel Rodgers*	SO	KHIS	Gina Gonzalez
Richard Knupp*	SO	PHES	Joshua Qualls
Ryan Sergent*	JR	PHES	Jennifer Birriel
Sierra Ott*	JR	AGR	Lauren Mirus
Tessa Whalen*	SR	BIOL/CHEM	Allen Risk

SMITH COLLEGE OF BUSINESS AND TECHNOLOGY

Student URF	Class	Department	Mentor(s)
Alexandre LeMaster*	SR	SECS	Qingzhou Xu
Allie Skaggs*	SR	SECS	Cheng Cheng
Bethlehem Seid*	JR	SECS	Heba Elgazzar
Chloe Whitlock*	SR	SBA	Steve Chen
Jon Jenkins*	SO	SECS	Sherif Rashad
Kyle Spurlock*	SR	SECS	Heba Elgazzar
Suhana Ambol*	JR	SECS	Sherif Rashad
Victoria Russ*	SR	SECS	Jorge Ortega-Moody Kouroush Jenab

VOLGENAU COLLEGE OF EDUCATION

Student URF	Class	Department	Mentor(s)
Brittany Stidham*	SO	MGSE	Kimberely Nettleton Sandra Riegle
Laura Von Mann*	JR	ECESE	Christopher Beckham

**presenting at the 2021 Celebration of Student Scholarship*

T

V

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