Re*SEARCH* Dialogues 2022 Online Program

" Bo Burnham and his Correlation to Philosophical Cynicism"
Madison Cothern

One could say that media has a significant impact on societal perception. Media and other forms of tertiary sources allow for the expression of cultural norms, the recording of events, and influences popular culture. The use of media as a tool to create a sense of interconnectedness also allows for the transpiring of ideas, some of which are hailed by some scholars to be core values of philosophy. One example of these core philosophical ideas is the concept of cynicism which has become a part of internet culture First discussed by the philosopher Antisthenes, the idea of cynicism encompasses the rejection of societal expectations and the challenging of change. The ideas of cynicism such as the challenging of societal norms has been discussed by comedian Bo Burnham who uses music, comedy, and satire to question philosophical ideas through media. This phenomenon has also been discussed from a different lens by author and educator Neil Postman who disdains the impact of television and radio among other technological innovations and their possible impact on culture. Suffice it to say, philosophical ideas, particularly the concept of cynicism, is not only highly correlated to perceptions of media, but also can contribute to significant cultural shift that exploit's media's potential negative impact.

https://symposium.foragerone.com/utc-research-dialogues-2022/presentations/40885

Re*SEARCH* Dialogues 2022 Online Program

"Bod on fire!:" Insta comments on perceptions of self body image
Audrey Pennington, Erin Syring

Fatphobia contributes to experiences of discrimination across various domains, particularly for women. Women of color (WOC) (as targets and perceivers) are often neglected in these investigations. The present study analyzes how one's body esteem is affected by viewing fat phobic comments on Instagram toward women (both White and WOC) on the fat spectrum.

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Re*SEARCH* Dialogues 2022 Online Program

"Documenting Religion in Chattanooga in 360-Degrees"
Christopher Johnson, Alisa Pickett, David Wilkins, Emma Gibson, Ezza Zahid, Hannah Petty, Kiara Baker, Levi Powell

This poster presentation consists of student-created 360-degree videos of Chattanooga-area religious communities viewed on a VR headset, along with accompanying websites and audio interviews about the communities. The videos and interviews were recorded by students over the Spring 2022 Honors College course "Religions Embodied and Virtual" during visits to local religious sites in Chattanooga. The videos are part of a broader project in which student groups select a community, explore its background and context, and then create websites and videos to share with the class and public. The project not only documents this area's rich religious diversity but also immerses students both physically and virtually in ways of religious belief and

practice that are different from their own. Among other questions, students asked communities about how they have adapted and coped with changes during COVID-19. Also integral to the project is student reflection on their encounters with religious difference and how virtual and embodied experiences vary in terms of creating a sense of presence, immersion, connection, and empathy.

https://symposium.foragerone.com/utc-research-dialogues-2022/presentations/42202

Re*SEARCH* Dialogues 2022 Online Program

"Integration of a Master of Public Health Program in COVID emergency response"
Dawn Ford, Mary Ferris, Brandon Denney

This presentation discusses the role of the MPH program in community and university response to COVID-19.

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Re*SEARCH* Dialogues 2022 Online Program

"Whatcha Into?": Exploring user experiences with bias and sexual harassment on Grindr
Luke Wiley, Alexandra Zelin

Research into apps with primarily MSM ('men who have sex with men') users has been limited. The app Grindr is the most popular app for MSM users. There has, however, been controversy regarding the limited and potentially problematic profile categories. BIPOC users have reported seeing profiles or messages with racial-sexual exclusions (Conner, 2019). Another issue stems from a preference for traditionally and even toxically masculine profiles, as well as a heavy emphasis on body size - a significant issue within the male LGBTQ community (Cascalheira & Smith, 2020; Wood, 2004). The purpose of this study is to obtain both qualitative and quantitative data about the experiences of Grindr users. We asked participants to quote the last ten messages in which the other user sent the first message. In addition, the participants were asked on a 5-point scale how often they encountered various biases. The most prevalent methodology for research into bias and prejudice on Grindr has been through the researcher creating an account in order to message users, or by the researcher interviewing users about their past exchanges on the app. By asking participants to use scales to report the frequency of seeing different forms of bias, as well as having participants directly copy and paste or quote messages sent to them, we present a novel methodology. While the data collection is still ongoing, our initial coding and analysis demonstrate a pattern of users being sent unsolicited sexually explicit images. The most commonly reported form of prejudice was sexual harassment. On a 5-point Likert scale (1 being 'Never' and 5 being 'Always'), the average frequency was 4.09 (SD = 1.167). Seeing or being subjected to sexual harassment (M = 4.03, SD = 1.589) and internalized homophobia (M = 3.91, SD = 1.255) were similarly rated in frequency observed. Seen somewhat less frequently, transphobia on average was rated a frequency of 3.15 (SD = 1.96). Participants reported seeing race or ethnicity-based biases less often, as anti-Black racism was rated 2.53 (SD = 1.71), anti-Latino/Latinx was rated 2.73 (SD = 1.64), anti-Asian was rated 2.69 (SD = 1.81), and Islamophobia was rated 2.19 (SD = 1.50). So far, no Grindr user has reported individual messages that perpetuate explicit racial-sexual exclusions; however, on the Likert scale, participants have reported seeing racial bias. Of the messages participants have thus far quoted, 32% were sexually explicit (e.g., sexually explicit introduction, compliment, image, question, or proposition), 72% were neutral (e.g., neutral introduction, compliment, image, question, or proposition), and 4% were 'other.' Messages could fall into more than one category.

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Re*SEARCH* Dialogues 2022 Online Program

Design Thinking: Incorporating 3D Design and Printing into Occupational Therapy Courses
Erin Melhorn

This project is a creative collaboration between occupational therapy and the studio librarian at the University of Tennessee at Chattanooga (UTC). Working together we created an interactive design-thinking lab experience to increase OT student understanding of 3D design and printing. Pre and Post data were collected over a three year period to understand the effectiveness of an inter-professional technology lab in the OT curriculum. The initial hypothesis was that students would not understand how to use 3D technology or the relevance of the profession of occupational therapy. All participants were second-year occupational therapy students enrolled in OCTH 7115 Models of Practice Assistive Technology in the fall of 2019, 2020, and 2021. Students participated in a 2-day 3D design and printing worship with Wesley Smith, Studio Librarian, and Dr. Erin Melhorn, OTD, OTR/L. Information obtained will be used to develop 3D design components of future OT courses and evaluate the effectiveness of the current course module. Results indicate a shift in knowledge after participating in the lab experience in support of design-thinking experiences implemented into the occupational therapy curriculum.

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Re*SEARCH* Dialogues 2022 Online Program

A study of the topology of various Sars-Cov-2 Spike Proteins
Achok Alier

Viral glycoproteins attain specific 3-dimensional conformations that are important for their function. We are using Mathematics to rigorously study the 3-dimensional conformation of SARS-CoV-2 spike proteins. We use the Writhe, a measure of complexity of curves in 3-space, to study their properties. We apply it to the different spike protein conformations and their domains to characterize the complexity of SARS-CoV-2.

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Re*SEARCH* Dialogues 2022 Online Program

An Analysis of the Survival of *Escherichia coli, Staphylococcus aureus*, and *Bacillus cereus* on the Surfaces of Occupational Therapy Devices Used During Full Hip Replacement Rehabilitation
Meredith Rippy

Healthcare-Associated Infections (HAIs) currently account for approximately 1.7 million infections and 99,000 deaths per year in United States hospitals. HAI's are defined as infections that develop in patients who have been in residence in a healthcare facility (i.e., in-patient clinics) for 48 hours or longer and who previously had no evidence of infection prior to admission. Consequences of HAIs include increased length of hospital stay, exposure to high frequency antibiotics, sepsis, and in unfortunate cases, death.

In out-patient environments where patients are receiving rehabilitative care, such as OT, they are often benefiting from the use of readily available therapy instruments. Instruments used in the outpatient setting are shared between numerous patients, hopefully being disinfected between uses with disinfectant wipes. The extent to which bacteria may survive on OT instruments with or without proper disinfection is unknown. The objective of this study is to help provide baseline statistics for the potential of bacterial survivability in multiple places of common OT instruments, such as reachers and sock aids. This study focused on the survivability of three bacterial species: *Escherichia coli, Staphylococcus aureus,* and *Bacillus cereus*, all of which are pathogens associated with HAIs in clinical settings. After application of known quantities of these bacteria to the devices, surviving cells were enumerated as long as 48 hours after inoculation. Data generated here will help establish the need for more focused disinfection protocols for these OT devices.

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Analysis of Graphene Produced from Atmospheric Carbon Dioxide (Provided by Ecophene)
Matthew Colson, Syed Tareq

Ecophene has developed a procedure for the manufacture of graphene from atmospheric carbon dioxide. The graphene produced from this approach was examined by a myriad of methods: Raman spectroscopy, scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR), and Brunauer-Emmett-Teller analysis (BET). The results of the Raman spectroscopy and FTIR indicate the presence of multilayer graphene with surface defects corresponding to -CO, -OH, and -C=O functional groups. The SEM analysis showed the surface of the graphene and a flake with a diameter of 73 µm. The BET analysis indicated that the surface area of the graphene was 329.7.3 m^2/g; it also indicated that most of the pore sizes were from 2 nm to 4 nm. Overall, this leads to the conclusion that the sample is reduced-multilayer graphene. Specific determination of the number of layers is designated for future work.

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Re*SEARCH* Dialogues 2022 Online Program

Exploring Additional Applications for Sheltered Instruction Observation Protocol
Cecily Honeycutt

The proposed exploratory study seeks to identify and describe ways in which Sheltered Instruction Observation Protocol (SIOP) could be used to facilitate academic gains and advancement in secondary student populations whose primary language (L1) is English. Operating under the premises that no individual is born innately possessing the academic language skills necessary to thrive in the American educational system and that these skills must be acquired both formally and informally over the course of one's adolescence, the researcher hypothesizes that employing the eight components of SIOP and its 30 features would be of academic benefit to all students regardless of their L1. A mixed-methods approach utilizing both descriptive and inferential statistics is suggested for the proposed study. This approach will allow both qualitative and quantitative data to be collected and analyzed in order determine the validity of the hypothesis as it relates to potentially expanding the uses of the Sheltered Instruction Observation Protocol model. Results will then be reported and future directions for study considered. The proposed study and its results could potentially have applications in a multitude of educational settings including, but not limited to schools and systems designated as Title I, Title III, Title V, urban, suburban, independent, or public.

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Re*SEARCH* Dialogues 2022 Online Program

Hybrid Two-Level Large-Eddy Simulation of Transition to Turbulence
Mickael Young

Laminar to turbulent transition is a commonly observed phenomenon in many aerodynamic applications. Therefore, an accurate prediction of the onset of transition and the corresponding flow features is important from the engineering perspective. The presence of flow complexities makes the numerical investigation of transitional flows challenging. Direct numerical simulation (DNS) can be used to examine the fundamental features of such flows. Large-eddy simulation (LES) tends to be more suitable for the investigation of practical applications. Models for LES are usually derived for fully developed turbulence, requiring improved or alternate strategies. In this study, the hybrid two-level large-eddy simulation (TLS-LES) strategy was employed to assess its capabilities in capturing the laminar-to-turbulent transition. This approach hybridizes the two-level simulation (TLS) model with a conventional LES strategy. TLS is a multi-scale model which computes both

large- and small-scales and unlike LES, it does rely on spatial filtering or eddy viscosity. To assess the performance of LES, TLS, and the hybrid TLS-LES approaches, two canonical flow configurations that exhibit a temporal onset of turbulence from an initially laminar state were considered. These flows include the Taylor-Green vortex flow and wall-bounded periodic plane channel flow. A series of simulations were carried out and the results are compared with DNS results to assess the performance of different modeling strategies.

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Re*SEARCH* Dialogues 2022 Online Program

Polyunsaturated fatty acids affect membrane permeability and antimicrobial activity of polymyxin B and colistin on *Vibrio cholerae*
Naina Patel

In recent years, public health officials have faced a great challenge with regard to antibiotic resistance. *Vibrio cholerae*, a gram-negative bacterium that normally resides in aquatic environments, is capable of adjusting its membrane phospholipid composition through the uptake and assimilation of exogenous polyunsaturated fatty acids (PUFAs). The purpose of this study was to measure PUFA-mediated changes in the membrane permeability and antibiotic resistance of Vibrio cholerae. Three physiologically relevant PUFAs were used: linoleic acid [18:2], arachidonic acid [20:4], and docosahexaenoic acid [22:6]). Bacterial membrane permeability was measured using a crystal violet assay with each PUFA resulting in at least a 10% change in the uptake of the dye. When the cationic cyclic peptides polymyxin B (PMB) and colistin were administered at subinhibitory concentrations, PUFA-specific permeability trends were observed. The availability of PUFAs caused significant changes to the minimum inhibitory concentrations (MICs) of PMB and colistin. Strikingly, each peptide was found to decrease the MIC by at least 4-fold. Not only do PUFAs alter bacterial permeability, but they also induce vulnerability to PMB and colistin in *V. cholerae*, perhaps suggesting synergistic potential in the control and prevention of pathogens.

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Re*SEARCH* Dialogues 2022 Online Program

The effect of original morphology on diagenetic pathways of microorganisms prior to fossilization
Ameerah Turner

A taphonomic assessment of coccoidal and filamentous microbial morphologies were preformed to determine which morphology decays first and the results were compared to fossil records.

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Re*SEARCH* Dialogues 2022 Online Program

A Distributed Electric Vehicle Charging Scheduling Platform Considering Aggregators Coordination
Shahab Afshar

This study establishes a distributed optimization framework based on the alternating direction method of multipliers (ADMM) for electric vehicles (EV) optimal charging management. The proposed approach solves a mixed-integer quadratic programming (MIQP) problem to minimize EV fleets' charging and battery degradation costs considering individual (dis)charging constraints and asymmetric TOU electricity tariff for charging and discharging. The primary contribution of this work is to create a coordination layer between EV aggregators (EVAs) to mitigate the stress on the power grid. At the same time, the proposed coordinated ADMM platform (CAP) approach preserves EVA and EV data privacy. Numerical tests evaluate the significance

of CAP in the EV charging management problem. The results confirm that coordination between EVAs increases the smoothness of the load profile.

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Re*SEARCH* Dialogues 2022 Online Program

A Literature Assessment of Using Wildlife Detector Dogs in Turtle Conservation
Hunter Smith

Conservation of turtle species the world over depends on scientists' abilities to effectively study these declining species. Wildlife detector dogs may provide a faster and more efficient method of locating turtles in a variety of environments. This in turn, could provide more accurate population estimates by increasing the limits of detection, and steering conservation outcomes. While the use of wildlife detector dogs in turtle conservation has had mixed success it remains clear that the usefulness in the dog's ability to consistently find turtles probable with proper training. Concerns of expense and feasibility often override the possibility of employing a professional wildlife detector dog. This project examines the conservation utility of training and implementing wildlife detector dogs for turtle conservation. Specifically, we will discuss metrics involving breed and individual selection as well as specific environmental scenarios of deployment. The consolidation of the materials that show most promise will be put into a decision support tool to be utilized by any organization planning to use dogs in wildlife detection for turtle conservation.

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Re*SEARCH* Dialogues 2022 Online Program

A New Popular Social Media App that Works to End Discrimination Against BIPOC Content Creators.
Amira Gunn

A business plan for a new social media app that allows content creators to be their most creative and authentic selves while being able to voice their opinions.

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Re*SEARCH* Dialogues 2022 Online Program

A Priori Assessment of Machine Learning Strategy for Modeling of Turbulent Premixed Combustion
Collin Lowery

Combustion within devices such as internal combustion engines, gas turbines, rocket engines, etc., usually occurs under turbulent conditions. Numerical investigation of turbulent combustion, which is characterized by highly nonlinear, unsteady, multi-scale, and multi-physics processes, is a challenging and computationally expensive task. A key component of the computational cost is related to the use of the finite-rate chemistry (FRC) approach, which needs to be addressed to enable the inclusion of detailed chemical mechanisms to accurately account for turbulence-chemistry interaction. In this study, we assess if the machine learning strategy, which has shown substantial success in the investigation of challenging problems from different fields, can be used for efficient modeling of FRC effects in the simulation of turbulent combustion. Specifically, we employ a deep learning (DL) technique relying on the artificial neural network (ANN) for modeling the reaction-rate terms. We present results from a priori assessment of such a strategy by considering results from a canonical freely propagating methane/air turbulent premixed flame in the thin reaction zone regime. The details of training and validation of the DNN based model will be presented in terms of reaction rate for different species, which are key for an accurate and efficient modeling strategy.

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Re*SEARCH* Dialogues 2022 Online Program

A Priori Assessment of Two-Level Simulation Model for Numerical Investigation of a Compressible Turbulent Mixing Layer
Haresh Chandrasekhar

There are several technologies in which turbulent mixing plays a critical role and which would benefit from improved models under compressible conditions. Direct numerical simulation can be used to gain fundamental insights into such flows however, it tends to be computationally expensive, thus requiring efficient modeling strategies such as large-eddy simulation (LES). However, there are modeling challenges in LES that arise due to disregarding aspects of sub-grid scale physics such as counter gradient transport, small scale anisotropy, etc. An alternate multi-scale modeling strategy referred to as the two-level simulation (TLS) model has shown promise in capturing a wide range of SGS physics for incompressible flows and scalar mixing. In this study, we assess the capabilities of the TLS model for the simulation of compressible scalar mixing. In TLS, a flow field variable is decomposed into its large-scale and small-scale constituents, and both the constituents are solved by employing modeling assumptions for the small-scales. Specifically, the small scales are solved on one-dimensional orthogonal embedded lines within a three-dimensional grid on which the large-scale flow field is computed. Therefore, modeling assumptions on the advection, viscous, and pressure gradient terms are used to simplify the small-scale equations. We perform a comprehensive a priori assessment of all the modeling assumptions by considering the DNS data corresponding to a compressive scalar mixing layer case with a range of convective Mach numbers.

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Re*SEARCH* Dialogues 2022 Online Program

Adversarial Machine Learning for Enhanced Spread Spectrum Communications
Donald Reising, Mohamed Fadul

Recently deep learning has demonstrated much success within the fields to image and natural language processing, facial recognition, and computer vision. The success is attributed to large, accessible databases and deep learning's ability to learn highly accurate models. Thus, deep learning is being investigated as a viable end-to-end approach to digital communications design. This work investigates the use of adversarial deep learning to ensure that a radio can communication covertly, via Direct Sequence Spread Spectrum (DSSS), with another while a third (the adversary) is actively attempting to detect, intercept and exploit their communications. The adversary's ability to detect and exploit the DSSS signals is hindered by: (i) generating a set of spreading codes that are balanced and result in low side lobes as well as (ii) actively adapting the encoding scheme. Lastly, DSSS communications performance is assessed using power constrained devices to accurately portray IoT and IoBT device limitations.

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Re*SEARCH* Dialogues 2022 Online Program

Amplifying Voices Through Podcasting
Michael Crosa, Allen Pratt, Chris Silver

Podcasting offers a low-barrier entry to media production, which helps voices that might otherwise be marginalized to be heard. The presenters will discuss the creation of their podcasts Jollyville Radio and The Rural Voice (the National Rural Education Association official podcast) and how to publish podcasts on major platforms such as Spotify and Apple Podcasts.

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Re*SEARCH* Dialogues 2022 Online Program

An Analytic Hierarchy Process and Markov Chain Based Method to Rate Condition and Predict Service Life for Retaining Walls
Weidong Wu

Once ignored, retaining wall management has been gaining significant attention from various transportation agencies due to overall deterioration of infrastructure systems in the United States To meet the requirements under the Moving Ahead for Progress in the 21 st Century Act MAP 21 many transportation agencies have developed retaining wall management programs covering condition rating and service life prediction of walls This research seeks to develop a systematic approach that integrates analytic hierarchy process (and Markov model for rating the current and predicting the future
conditions of retaining walls An overall rating score is achieved through hierarchical configuration and pairwise comparison of retaining wall elements using AHP that respects engineering principles by considering importance weights This aggregated score, together with transition probabilities, will then be passed on to the Markov model for retaining wall future condition rating and service life prediction As a pilot study, the proposed approach is applied to selected retaining walls in Tennessee to validates its feasibility The comparison of service life predictions by the statistical exponential regression and the
integrated AHP Markov approaches indicates the need for retaining wall condition rating database

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Re*SEARCH* Dialogues 2022 Online Program

An End-to-End System for Anomaly Detection Using Machine Learning on Knowledge Graphs
Lucas Payne

This project provides an end-to-end system for detecting anomalous behavior in a computer network based on analyzing system and server logs with machine learning techniques. Information across the set of log files is organized into a knowledge graph, which captures the entities within the network and their interactions with each other. A machine learning model based on knowledge graph completion is trained using normal network behavior. Then, new behavior passed through the model is evaluated and compared to the behavior the model has been trained on. The model returns a suspicion ranking from 0 – 4 for this behavior. This range of possible values will help security analysts better determine whether and how to respond to incidents based on their potential severity.

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Re*SEARCH* Dialogues 2022 Online Program

An Exploration of COVID Experiences in Undergraduate Nursing Students at UTC
Sarah Green, Chanda Okyere, Jenny Holcombe

The purpose of the current study is to describe the COVID experiences of undergraduate nursing students at UTC. Data will be collected via an anonymous Qualtrics survey link emailed to all current undergraduate

nursing students in Spring 2022. Data will be analyzed using descriptive statistics in SPSS v28. Understanding the type of experiences students have had with COVID can inform faculty on how to meet student needs and address any potential residual issues (PTSD, anxiety, second victim, etc.) that could stem from their experiences.

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Re*SEARCH* Dialogues 2022 Online Program

An exploration of employment attitudes & opinions across levels of undergraduate nursing students
Paige Bertholf, Kallan Blackenburg, Jenny Holcombe

The purpose of the current study is to explore potential differences in employment attitudes and opinions across different levels (5) of undergraduate nursing students at UTC. Data will be collected via an anonymous Qualtrics survey link emailed to all current undergraduate nursing students (n=~200) in Spring 2022. Data will be analyzed via descriptive statistics and ANOVAs using SPSS v28. Understanding differences between levels of undergraduate nursing students may offer insight into how employment attitudes and opinions change during nursing school, and possibly as a result of exposure to various parts of the curriculum/clinical experience.

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Re*SEARCH* Dialogues 2022 Online Program

Analyzing Twitter Data to Evaluate People's Attitudes towards Public Health Policies and Events in the Era of COVID-19
Meng Tsai

Policymakers and relevant public health authorities can analyze people's attitudes towards public health policies and events using sentiment analysis. Sentiment analysis focuses on classifying and analyzing text sentiments. A Twitter sentiment analysis has the potential to monitor people's attitudes towards public health policies and events. Here, we explore the feasibility of using Twitter data to build a surveillance system for monitoring people's attitudes towards public health policies and events since the beginning of the COVID-19 pandemic. In this study, we conducted a sentiment analysis of Twitter data. We analyzed the relationship between the sentiment changes in COVID-19-related tweets and public health policies and events. Furthermore, to improve the performance of the early trained model, we developed a data preprocessing approach by using the pre-trained model and early Twitter data, which were available at the beginning of the pandemic. Our study identified a strong correlation between the sentiment changes in COVID-19-related Twitter data and public health policies and events. Additionally, the experimental results suggested that the data preprocessing approach improved the performance of the early trained model. This study verified the feasibility of developing a fast and low-human-effort surveillance system for monitoring people's attitudes towards public health policies and events during a pandemic by analyzing Twitter data. Based on the pre-trained model and early Twitter data, we can quickly build a model for the surveillance system.

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Re*SEARCH* Dialogues 2022 Online Program

Application of Geospatial Technology to Map the Potential Locations of Chert in the Daniel Boone National Forest, Kentucky
Hannah Bowman

The Daniel Boone National Forest (DBNF) is located in Eastern Kentucky. The DBNF was a desirable place for Native Americans throughout prehistory. Native Americans utilized this region from as far back as 10,000-12,000 years ago. Stone tools were used extensively by the hunters and gatherers within the area to hunt and/or process food. Chert, an extremely hard and durable microcrystalline quartz, was used by Native Americans for stone tools. In eastern Kentucky, most chert tools exhibit a cobble cortex, which strongly indicate that raw materials were being procured from stream locales. The DBNF is abundant with waterways flowing through the mountains and valleys in the forest, which is another desirable characteristic of the area. With this information and curiosity about Chert and its pathway through waterways, this research was designed to use GIS for mapping the potential locations of Chert used by Native Americans for stone tools. The State Geologic Map Compilation (SGMC) provided online by the USGS, and other administrative and hydrologic GIS data were used in this study. The tasks that were completed in GIS to find the potential locations of cobble chert include: (1) taking the DBNF boundary along with the geological maps and converting this information into polygons, (2) cross referencing this information against a watershed map of the DBNF in order to create possible locations where Native Americans may have found chert, and (3) categorizing this data to describe the potential for chert in the area. The obtained analysis results will be used to create a series of maps for future archaeologists and geologists to field check these locations for samples of raw materials. The maps and the corresponding GIS data will be further processed to visualize on Google Earth imagery.

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Re*SEARCH* Dialogues 2022 Online Program

Application of Remote Sensing to Study the Potential Impact of Wildfires on Glaciers
Shelby Campbell, A.K.M. Azad Hossain

Wildfire activity across the globe has been on the rise in recent years, as climate change continues to warm global temperatures. Wildfires generate ash, soot, and other light-absorbing particles (LAPs) that can be deposited on glacial surfaces. However, understanding the true effects of wildfires on glaciers is difficult to assess, because in situ field measurements can be difficult to obtain. Catastrophic wildfires plagued the Western United States in 2020 and emitted large amounts LAPs into the atmosphere. LAP's make their way to the surfaces of glaciers through long-range transport through the atmosphere and through wet and dry deposition. Satellite imagery shows that LAPs cause significant snow-darkening of glaciers on large glacial surfaces, like polar ice sheets. However, the methods for using remote sensing technology on smaller, more regional surfaces is less understood. This study uses a time series of 3 Sentinel-2 multispectral images to assess the changes on the glacier surfaces of Mount Baker, Washington (Fig.1) in response to the record-breaking 2020 wildfire season in the Western US. This is ongoing research. Preliminary results suggest that the use of NDSII2 calculations is a viable method for visualizing and understanding LAPs on glaciers.

Increased wildfire activity in response to climate change will have a significant impact on glaciers across the world and utilizing remote sensing technology to assess those effects will be crucial to monitoring future changes in the cryosphere.

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Re*SEARCH* Dialogues 2022 Online Program

Are minimization tactics appropriate for interrogating autistic and neurotypical juvenile suspects?
Akera Williams

The purpose of this current study is to determine if there are differences in the way that interrogations of juvenile suspects are viewed, depending on the age of the juvenile suspect and whether or not he is described as being diagnosed with Autism Spectrum Disorder. Participants were presented with the case background,

describing the crime and the suspect, a police report on the interrogation and confession, and excerpts of the interrogation with actual dialogue. Based on prior research, we expected that mock jurors will view the interrogation of the 16 year old non-autistic suspect as more fair, less coercive, and leading to a confession that is valid. We also expected mock jurors to view the interrogation of the 12-year-old as unfair and the confession as invalid regardless of his diagnosis.

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Re*SEARCH* Dialogues 2022 Online Program

Assessing substance misuse and pandemic-related stress among students in a southeastern university
Shelby Nolan, Breanna Long, Matt Pankey, Marissa McErlone

Introduction: The opioid epidemic has become a major public health concern in recent years, especially during COVID-19. Opioid death rates continue to increase among young adults, ages 18 to 24. Additionally, young adults have experienced increased rates of mental illness and stress during the pandemic. This increase in pandemic-related stress may lead to development of negative coping mechanisms like opioid and other substance misuse among college-aged populations.
Objective: Assess rates of substance misuse and pandemic-related stress during the COVID-19 pandemic among students at a southeastern university.
Methods: A cross-sectional survey was distributed to all students via an online survey platform (Qualtrics) during Spring 2022. This 28-item survey, adapted from existing and validated tools, explored knowledge of opioids and opioid overdose risks and response, pandemic-related stress, stress-related coping mechanisms, and opioid misuse during the COVID-19 pandemic. Descriptive statistics were calculated in Qualtrics, SPSS Version 28, and Excel.
Results: The student sample (n=171) primarily identified as White (65%), females (67%) between the ages 19 and 21 (56%). Over a third (39%) of the participants reported no involvement with student organizations on campus. Forty-seven percent, 60%, and 33% of participants passed the general opioid, opioid overdose risk, opioid overdose response knowledge test, respectively. COVID-19 Student Stress score (17.5±1.48) indicated a high stress level among participants. Social isolation (2.9 ± 1.20) and academic studies (3.1 ±1.27) were the highest scored stress indicators. Alcohol consumption (67.3%) and marijuana use (58.4%) were the most frequently reported negative coping mechanisms, while opioid use (13.5%) was the least reported among participants.
Conclusion: During the pandemic, students in this study experienced high levels of stress and more than half of the participants reported various substance use as a coping mechanism, with some indicating opioid use. While future studies need to explore the relationship between pandemic-related stress and substance misuse, these data can inform university policy and programs to address substance misuse on campus during and beyond the pandemic.

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Re*SEARCH* Dialogues 2022 Online Program

Assessment of UTC Sustainability Initiatives
Nia Alstom, Caroline Coles, Chelsea Diaz, Alex Earp, Georgia Greer, Joseph Hopson, John Tucker

Sustainability is the balance between the environment, equity, and the economy. It serves the purpose of providing the needs of people in the present day without compromising the needs of future generations. By incorporating sustainability within our higher educational systems, we are meeting the needs of students and faculty while sustaining the needs of future students and faculty. Incorporating sustainability in universities and colleges also allows students to learn the importance of sustainability to help promote sustainable practices within their personal lives and the campus community. This study summarizes UTC's primary sustainability initiatives and assesses progress toward achieving sustainability. Our research methodology

included reviewing existing UTC initiatives, interviewing key personnel on campus, investigating sustainability practices at other educational institutions, and researching additional approaches to achieve sustainability. We utilize these components for the purpose of assessing, reconsidering, and improving UTC's current sustainability practices and initiatives while being economically feasible.

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Association between Physical Activity and Health-Related Quality of Life in Stroke Survivors
Grace Peters, Danielle Ged, Micah Smart

The American Heart Association/American Stroke Association's (AHA/ASA) physical activity (PA) guidelines state that adults post-stroke should perform at least 150 minutes/week of moderate-intensity aerobic exercise and muscle strengthening of moderate or greater intensity on at least 2 days/week. The purpose of this study is to examine stroke survivor data from the 2011-2021 Behavioral Risk Factor Surveillance System (BRFSS), and to compare self-reported measures of physical health (PH) and mental health (MH) for those individuals who met physical activity (PA) guidelines to those who did not. We will also report those activities/exercises that stroke survivors most frequently engaged in with regard to the guidelines.

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Attitudes Towards Severe and Persistent Mental Illness
Alexis Florence, Lynne Marchetti, Jessi Faircloth, Carmela Depaz, Alanna Smith

Background: The intended purpose of this study is to inform research on prevailing attitudes of students on a midsize public college campus in the Southeast towards Severe and Persistent Mental Illnesses (SPMI). Specifically, research focused on the social stigmatization of Severe and Persistent Mental Illnesses. The overarching hypothesis is that Severe and Persistent Mental Illnesses have been highly stigmatized within University settings, making it less accessible for these students to thrive in their individual and academic pursuits. Through our literature review we were able to define SPMI as a representative of a patient population and not any one disease, (Zumstein et al, 2020).We examined the literature that define structural stigma as " rules, policies and procedures within organizations and society at large and furthermore treat people with mental illness … as less treatable and less deserving of care(Corrigan, 2004). Furthermore, studies show that there are four social-cognitive processes, three of which -stereotype, prejudice, and discrimination- "culminate in the formation of stigma", (Corrigan & Bink, 2016). Studies also showed that most stigmas can be removed with increased public awareness of mental illness and the symptoms that go along with it through education (Parrish, et al., 2019).

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BEAST: Behavior as a Service for Trust Management in IoT Devices
Brennan Huber

As the internet becomes intertwined into every aspect of human lives, security of the Internet of Things (IoT) becomes increasingly critical.
IoT devices become the data source for variety of smart cities applications, where critical decisions are based on this collected data.

If malicious actors control or tamper with the data being transmitted, the integrity of an entire smart city will be compromised.
Therefore, through monitoring the IoT devices' behavior, anomalies can be detected and isolated to avoid any negative impact on decision making.
This behavioral monitoring process will complement traditional trust management approaches, as more accurate trust value can be calculated without the need to rely on a majority consensus.
In this work we present a behavior as a service methodology that implements a deep learning based behavioral model to accurately classify IoT devices' interactions in the system.
Through the Elo rating system, these classifications will be presented as a vector of behaviors per device, which dynamically reflects on the device's trust in the system.
This work presents an analysis of our methodology as well as a threat model. Using simulation, a real-world use-case is presented showing the interactions between IoT based devices. Our results show that our behavior as a service model is able to dynamically evaluate each IoT device's trust as well as capture and mitigate multiple threats targeting the trust in the system.

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Being Present for the Future: Exploring Mindfulness and Prospective Memory
Christopher Nuño

Although mindfulness research has become a trending topic in cognitive science, there is a gap in the literature that fails to explore the relationship between mindfulness and prospective memory (i.e., the ability to remember to execute a future intention). To explore this relationship, students in either a mindfulness condition or vocabulary control condition were asked to complete 10 self-concordant academic tasks (both time-based and nontime-based) over the course of five days. The percentage of academic tasks completed was calculated to measure prospective memory completion. Prospective memory performance was compared between groups and between task type. Trait mindfulness was also measured and explored as a predictor of performance. Performance between conditions was equivalent. Time-based task performance was significantly worse across conditions, and mindfulness did not seem to produce any changes in the ability to complete either task type. Significant correlations were, however, observed between trait mindfulness and prospective memory performance.

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Black-Box Machine Learning Attacks Against GoogleNet
Jacob Motley

The machine learning landscape is vast and holds many opportunities for Cyber Security research. One area where the two fields intersect is that of black-box attacks against classifier systems. Classifier systems are shown to be vulnerable to these attacks without knowledge of the model architecture. Potential vulnerabilities include fooling self-driving car systems and facial recognition systems. The GoogleNet architecture is tested for weakness against black-box attacks and the results are given in this presentation.

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Calibrating Microscopic Traffic Simulation Model for a Large-scale Network

Seyedmehdi Khaleghian

This study presents a novel calibration approach for a city-scale traffic simulation model based on limited real-world speed data (RSD). The simulation model runs a microscopic and mesoscopic realistic traffic simulation from Chattanooga, TN (US) for a 24-hour period and includes various transport modes such as transit buses, passenger cars, single-unit trucks, and multi-unit trucks. In this research, we introduce a toolkit for researchers to easily conduct calibration for their own traffic scenarios. The toolkit supports several state-of-the-art algorithms and is designed to run in parallel to utilize the power of high-performance computers. Moreover, by using this toolkit, we conduct in-depth experiments to understand which factors affect the calibration performance.

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Career and Technical Education (CTE) Dual Enrollment: Common Issues and Challenges Facing Program Implementation and Student Success
Carl Miller

Abstract
Expanding dual enrollment beyond the traditional academic model provides an academic opportunity for underserved students. The aim and objective of this research article is a focus on career and technical education (CTE) dual enrollment programs offered by the Tennessee College of Applied Technology at Chattanooga State Community College (TCAT-CS) and to identify common issues facing CTE dual enrollment specifically those in the southern region of the United States. CTE dual enrollment creates an academic pathway that provides students, specifically underserved students, a pathway of study to earn most of the college credit while in high school. For the sake of this study and review, feasibility requires a long-term mixed-methods approach, and this current research article relies on data from other technical institutions whose programs have matured and are well-established. Their data provide information that supports the hypothesis that students are not only college-ready but career-ready for their respective fields. TCAT-CS is in its early stage of development and seeks guidance and a clearer understanding of CTE dual enrollment based on prior research, its potential outcome, and its impact on current and future CTE dual enrollment with its stakeholders.
Key Terms: Program alignment, Career Technical Education (CTE), dual enrollment, clock hours, a pathway of study, matriculation, Early Post-Secondary Opportunity (EPSO), and state policy.

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CHEPS Residential Learning Community: How it Began and Is Going
Liz Hathaway, Kim Wingate, Tessa Mullinax-Baker

During Fall 2021, the Department of Health and Human Performance (HEALTH) and School of Nursing (MASH) joined the School of Education (RISE) in offering residential learning communities for its students. Students participated in HEALTH, MASH, and RISE events, but also enjoyed activities as a larger CHEPS RLC group. During this presentation, a faculty representative from each RLC will share details about activities and experiences during the Fall semester, and data (quantitative survey data and qualitative focus group data) will be presented on (a) student demographics, (b) comparison of feelings of connection from beginning versus end of semester, (c) student comments about participation in the RLC, (d) student retention rates, (e) lessons learned/obstacles for future RLC implementation, and (f) next steps.

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Classification of the variant of SARS-CoV-2 with deep learning
Parisa Hatami

With the rapid spread of Sars-CoV-2 and its variants all over the world, Epidemiological studies estimate that more infected variants of it will emerge. Some variants show enhanced transmission whereas many others do not. It is therefore of great importance if we could predict the variant features based on their sequences. To this end, we propose a deep learning method to classify genetic sequences of SARS-CoV-2. The genetic sequences of SARS-CoV-2 variants are available on Global Initiative on Sharing All Influenza Data (GISAID). There are 15702 sequences with 7 labels in the GISAID dataset. Each sequence has a length of 38782 and it is challenging to use them as input. The raw sequences must be converted to numerical representation before training. To tackle this issue, we encode them using one-hot encoding. A 1D convolutional neural network is used for text classification and it is useful for the classification of sequences. In our preliminary results, a 1D convolutional neural network is trained on the one-hot encoding of sequences to classify the variant of Sars-CoV-2. We hope to develop more sophisticated models in deep learning for the classification of different types of Sars-CoV-2.

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Coevolution or Geography: What Drives Parasite Diversification?
Will Hanson-Regan

For much of the past century, parasite phylogeny was assumed to mirror that of the host. However, recent studies have called this into question. While phylogenies may match on a broad scale, when looked at on a species level, the coevolutionary relationships are often not significant. If parasites are not coevolving due to interaction with their hosts, then what does drive their evolution and speciation? We tested if geography or host relatedness plays a more significant role in determining diversity and distribution of parasites infecting Central American characid fishes.

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Comparative Fitness of SARS-CoV-2 Clades
Landen Bauder

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the viral coronavirus that causes the infectious disease we know as COVID-19. The GISAID genomic database groups the genetically diverse COVID-19 viruses into clades based on their phylogenetic distances. Assuming exponential growth of all populations, I calculated the log-transformed ratio of the population of each clade containing a variant of concern (VOC) over time to compare their relative fitness. This comparison was done globally as well as by continent. I show how clade fitness advantages can vary based on the length of time that is monitored. Using the log ratio of clade growth rates, transmissibility of two SARS-CoV-2 clades can be compared over any given time.

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Comparing Anuran Diversity and Abundance in Natural and Artificial Wetlands in Tennessee
Jeremiah Rhodes

With Earth currently involved in a human caused mass extinction event, amphibian populations are diminishing more rapidly than all other species of animals. Habitat destruction, urbanization, and industrialization have all been causes of population declines. Wetlands, a common habitat for anurans, have also been decreased. Over 100 million acres of wetlands have been destroyed in the United States. With the destruction of wetlands, private companies or agencies try to remediate their actions by building artificial wetlands in other areas. Studies have found there to be clear positive relationships between frog communities and wetlands conditions but does that mean anuran abundance and diversity will be higher in natural wetlands compared to artificial wetlands. By following the North American Amphibian Monitoring Program protocol, we will conduct a manual frog call survey on 10 natural wetlands and 10 artificial wetlands in Tennessee. After data collection, an occupancy model will be used to estimate abundance among sites, and diversity will be compared. By comparing data collected with USGS data, we should be able to determine if anuran populations have been stable or declining. Tennessee is a biodiversity hotspot for amphibians. To keep this designation, there should be more regulation to stop the destruction of wetlands, one of the most important habitats for anurans.

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Complex Folding Patterns of Lysozyme in Ionic Solution
Sydney Carr

Lysozyme is an antimicrobial enzyme that is fundamental to the innate immune response. Like all proteins, lysozyme's function is dependent upon folding into its native state. By introducing the protein into solutions with varying ion concentrations, we can visualize the effect these conditions have on the stability of the protein. Using GROMACS molecular dynamics simulator. We study how different concentrations of sodium chloride influence proper folding of lysozyme. Once this state of equilibrium was reached, various structural properties of the protein were measured including the radius of gyration and the radial distribution function. Our goal is to find what conditions increase the stability of the enzyme.

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Computational Analysis of Lift Effects from Distributed Electric Propulsion at Varying Flap Deflection Angles
Jacob Jenkins, Emma Hughes

In the pursuit to lower carbon emissions, NASA has produced the first manned "X-plane" in decades, the X-57 Maxwell. The X-57 Maxwell is a large-scale, all-electric aircraft that has a distributed electric propulsion system. Due to the distribution of 12 high-lift propellers along the span of the wing, the X-57 can generate extremely high lift at low speeds, such as takeoff and landing conditions. Using Computational Fluid Dynamics (CFD), basic lift characteristics due to the distributed electric propulsion are studied in addition to an analysis of varying takeoff flap deflection angles on the overall lift. The simulations are run using NASA's FUN3D with the propellers simulated as actuator discs. This assumption allows for simpler grid generation and uses energy and momentum inputs to account for the effects of the propellers.

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Computational Modeling of the Effects of Process Parameters on the Grain Morphology of Additively Manufactured Stainless Steel
Saeed Ataollahi

The microstructure of the parts created using Directed Energy Deposition (DED) additive manufacturing method, vary notably due to a change in the processing parameters. Since there is a direct relation between grain morphology and the mechanical properties of a part, understanding the effects of each process parameter on the grain morphology is critical towards optimal fabrication of parts using DED method. In this study, Kinetic Monte Carlo (KMC) method was used to model the DED of parts made of 304L stainless steel. In order to simulate the grain evolution, KMC Potts model, which is a statistical mechanics model, was implemented. Using this model, the fusion zone that comprises the melt pool and Heat Affected Zone (HAZ) are simulated as two concentric ellipsoids. The kinetics provided by the fusion zone results in grain growth. To see each process parameter's effect on the grain morphology, a parametric study was conducted on the effect of scanning speed and layer thickness on the microstructure of deposited material. The final results were analyzed qualitatively and quantitatively by using an image processing software. It was found that by increasing the scanning speed, the number of fine grains at the centerline of the laser path increases significantly. In addition, we found that in very small layer thicknesses, fine grains cannot grow and mostly disappear. This happens as a result of a too small layer thickness compared to the depth of the melt pool, which results in each layer being melted multiple times due to passage of laser on the subsequent layers.

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Computer Vision in Manufacturing
Tytton Elkins, Dylan Parker, Allen Nesmith

This study is focused on the development of computer vision in manufacturing and industrial applications. The goal of the study is to create a 4 degree of freedom cartesian robot that can sort small cubes based on the cubes' color. This is done using a Raspberry Pi and a Raspberry Pi camera module, along with OpenCV libraries. For the setup, there will be 3 different color options for the cubes, and a small shelf next to the robot. The operation of the robot will start with cubes that will be placed on the workspace of the robot. An operator can then specify which color and how many cubes they would like to sort. Afterward, the robot will activate and carry out the sorting operation.

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Conflict Resolution and Interpersonal Tolerance: A Qualitative Approach
Nathan Scarbeck, Zachary Swanson

Marcuse (1969) suggests that a Tolerant society must be exclude intolerant disposition whereas Rauch (1993) contends that intolerant points of view must be included for a society to be tolerant. Ongoing research within the Faith Development Project, an international, grant-funded, collaboration of researchers seeks to examine the degree to which Conflict Resolution is informed by willingness to tolerate those of opposed views. Data presented is extracted from Faith Development Interview Question 25: "When it comes to issues of conflict of

religion or worldview, how can such conflicts be resolved?" Qualitative answers are analyzed and categorized via emergent Thematic Analysis. These themes were compared to previous literature and utilized to generate the S.I.X. Approaches to Toleration, Segregation, Integration, and Xenosophia and proposes a *deep* vs. *shallow* structure to each approach.

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Consequences of the environment: timing of litter parturition and offspring survival in the social rodent Octodon degus
Miles Matchinske

Variation in the timing of reproduction, which is influenced by environmental and individual factors, may impact population fitness through differences in early-life effects on offspring. The time at which offspring are born determines the environmental factors they experience during early development and their likelihood for survival. We used an 11-year dataset on a natural, free-living population of degus (Octodon degus), a social rodent endemic to Chile, to test predictions that ecological, social, and maternal conditions during the breeding season are associated with the timing of litter parturition and intragroup litter synchrony. We also tested predictions that the early-life conditions offspring experience and the time at which they are born influence their survival to the next breeding season. Measures of food abundance experienced by females during breeding predicted their parturition day. Furthermore, differences in food abundance and phenotypical masculinization (determined by anogenital distance) between focal female groupmates predicted differences in their parturition day (an indicator of litter synchrony). Females that experienced more food gave birth earlier in the year and pairs of females with similar phenotypical masculinization and food conditions shared a greater difference in their parturition day. No effects of the early-life conditions experienced by offspring nor effects of parturition day on offspring survival were identified, suggesting that survival of degu pups to the next breeding season may be influenced by other factors.

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Conservation of *Prunus* Genetic Resources in Southeast Tennessee
Hannah Nelms

The methods and outcomes are described of an internship with the UT Tree Improvement Program focusing on the conservation of *Prunus* genetic resources. The goal is to create seed orchards of wild plums and cherries collected from naturally occurring populations. The materials produced would be locally adapted and genetically diverse to serve as a source for conservation plantings and to make seed available to the East Tennessee State Nursery. However, the propagation of rooted hardwood cuttings of native *Prunus* is not well described in literature. Surveys are conducted based on herbarium records and inaturalist. Cuttings are collected for the propagation of hardwood rooted cuttings. Cuttings are given a flat basal cut, 5 mm below a bud, with two wounds and dipped in 3000 ppm IBA. The cuttings are stuck in propagation beds in a cool greenhouse with 70F basal heat. The success of the rooted hardwood cuttings and further needs for the establishment of a Southeastern Tennessee *Prunus* seed orchard will be accessed.

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Corrosion Assessment of Biodegradable Magnesium Alloys for Orthopedic Applications

Wendy Reynoso-Diaz

Currently-in-use orthopedic implants are made of stiff and nonbiodegradable metals such as titanium and stainless steel. While these implants have been used for many years, their permanent existence in the body results in several complications after bone healing. Complications, such as bone resorption, future implant fracture, and possible infection and inflammation. Hence, there is a need to develop temporary biodegradable implants that can eliminate these problems and enhance patients' treatment outcomes. Biodegradable metals are most suitable for use over temporary periods of time due to their superior mechanical strength and biocompatibility. Magnesium alloys are the most promising materials to be used as biodegradable implants mainly due to their superior biocompatibility and lower specific density compared to zinc and iron-based alloys. To find the most suitable implant for orthopedic applications, the composition of pure magnesium is reinforced to improve its properties, most specifically to decrease its corrosivity. Experimental in vitro corrosion tests were conducted on patent-pending biocompatible Mg-Zn-Ca-based alloy fabricated using different manufacturing methods and purity levels. The corrosion rates of As-Cast High Purity alloys, As-Cast Low Purity alloys, and Hot Rolled Alloys were compared to that of commercial pure magnesium.

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Corrosion Assessment of Biodegradable Magnesium Nanocomposites for Orthopedic Applications
Shelby Hash

Orthopedic implants, commonly made of steel and titanium-based alloys, remain permanently in the human body after bone healing unless removed by means of a second surgery when causing complications. Over the last few decades, biodegradable (nonpermanent) orthopedic implants have been explored for human applications to address the problems of the currently-in-use permanent implants. Biodegradable implants, made of magnesium alloys or magnesium-based composites, offer a promising new alternative due to the superior biocompatibility and advantageous properties of magnesium compared to other biodegradable materials. For instance, magnesium is a lightweight metal that has a modulus of elasticity similar to that for natural bones. In addition, it is an essential component in dietary systems of all ages making it a very biocompatible material. However, magnesium is not strong enough and it corrodes very quickly in body fluid, leading to poor biomechanical performance and subcutaneous gas pockets within bones. One of the approaches to address these limitations is to reinforce pure magnesium with nanoparticles, to create a new class of magnesium-based nanocomposites, in hopes of improving its mechanical and corrosion properties. In this work, magnesium nanocomposites reinforced with different contents of boron-based nanoparticles (0.5 and 1.5 at. %) were studied. Experimental hardness tests and *in vitro* corrosion tests were conducted to investigate the effect of the added nanoparticles on the mechanical and corrosion properties. Our results show that the mechanical properties can be significantly improved by adding the boron-based nanoparticles without a significant deterioration in the corrosion properties.

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COVID Trends Analysis
Andrew Calkins, Chris Tompkins

Google Trends is one of the most efficient trend analyzers to determine Internet search behavior. Google search is based on pattern analysis focused on the most searched keywords that are centered around concerns of the general public. By using Google trends data, we began track public interest in the pandemic and related topics and correlate with it with publicly available COVID data such as death's, new cases, and vaccine

deployment. Trend data will be analyzed using visualization tools in R and R package “gtrendsR”. Association study will be conducted to investigate association between the actual cases, and vaccination rate across all states and relative search amount on keywords including COVID-19 and COVID-19 vaccination, booster etc.

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Crisis Leadership: Flying the airplane while you are building it
Dawn Ford

This presentation considers the 4 pillars and 10 principles of crisis leadership in the context of COVID-19 response at both the national level and at UTC from the perspective of a central responder.

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Cuban Women: Lessons in Autonomy, Stewardship, and Hospitality
Anna Smith

Since Cuba and the United States each have their varied strengths and weaknesses, each can offer the other lessons in how to reform for the advancement of the individual and the broader community. This paper will draw upon the perspectives of Cuban women, particularly two Cuban immigrants, and synthesize their experiences of life in Cuba and life in the United States, in order to ascertain lessons of autonomy, stewardship, and hospitality, and the role these play in social reformation.

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Current Knowledge and Interventions of Intensive Care Unit Delirium Among Occupational Therapy Practitioners
Kaitlyn Cavins, Cailey Curry, Rachael Hunter, Allyna Kerley, Brittany Work

Despite the high prevalence of intensive care unit (ICU) delirium among hospitalized patients, research indicates that it is a severely under-educated topic in healthcare professions. Preventative interventions from a multidisciplinary approach have decreased the duration and incidence of ICU delirium, including early mobility, sleep hygiene, education, and environmental modifications. In this mixed method design, a survey questionnaire was used to gain understanding in interventions currently used by occupational therapy (OT) practitioners in the treatment of ICU delirium, as well as understand and identify gaps in education. The purpose of this study was to understand the current knowledge and practice of OT practitioners in the acute care setting in the prevention and treatment of ICU delirium. The survey was completed by both occupational therapists and occupational therapy assistants (n=61), with most respondents (n=39) reporting less than 5 years of acute care experience. While most practitioners (n=58) knew what ICU delirium was, nearly half (n=28) reported receiving no training or education on ICU delirium. Most respondents (n=54) reported treating patients experiencing ICU delirium at some point. Most practitioners reported utilizing interventions such as ADL/IADL engagement, reality reorientation, and early mobility to prevent and address ICU delirium. The findings of this study indicate a gap in education addressing ICU delirium for OT practitioners. The findings further suggest that ICU delirium remains prevalent among hospitalized patients and provides current practices of OT practitioners for prevention and treatment of ICU delirium in their patients.
KEY WORDS: delirium, intensive care unit, occupational therapy, rehabilitation

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Depression Rates Among LGBTQ+ Individuals Compared to Heterosexual Individuals
Chloe Nicholson, Sarah Feely, Megan Balut

According to previous research, LGBTQ+ youth and young adults have a higher risk of depressive episodes, substance abuse, isolation, sucidial ideation, and suicide attempts (Backhaus et al., 2021; Ciro et al., 2008). Compared to their peers, LGBTQ+ are 1.5 times more likely to suffer from depression and certain subgroups, such as transgender persons, are 53.9% to have diagnosable mental health symptoms (Kaniuka et al., 2018). Our three research questions are: 1) Is there a difference in depression rates among LGBTQ+ and heternormative individuals? 2) Is there a difference in LGBTQ+ subgroups' depression rates? 3) Is there a difference in rates of depression in LGBTQ+ adults between red and blue states? This study is important because of the prevalence of the issue of mental health in the LGBTQ+ community and how this impacts a persons well-being. More research is needed focusing on specific LGBTQ+ subgroups where there is a lack of literature on those who identify as bisexual who are often grouped under gay or lesbian (Pollitt et al., 2017). Our study uses the BFSS national survey, narrowing it down to a sample of 41,846 survey participants. Research was gathered through this national survey and ran in SPSS. We use chi-square tests to analyze our data and look for any significance or relationships. Our results show that depression and LGBTQ+ individuals have higher levels of depression than heteronormative individuals. Additionally, data shows that the transgender population has a higher level of depression than nontransgender person. The findings from this study are significant because mental health is a prevalent issue in the LGBTQ+ community and further research is needed to address this problem and create solutions and policies to help the community.

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Design of Compact Reserve Systems for Ecological Conservation
Mark McFeaters

Protected large and compact areas are imperative in biological conservation efforts. The classical set-based models select areas that maximize the protection of the most species or minimize the cost of choosing locations to provide small regions scatted for selection. Recently, more models have been proposed to create protected areas that are large and compact. We demonstrate a new approach that integrates these goals to create a reserve system of one or more clusters that are efficient, extensive, and compact. We identify compact groups using graph density which define as the ratio of the number of graph edges to the number of nodes. Although maximizing graph density can be formulated as a fractional optimization problem, we show it can be structured and solved as a linear integer program. We demonstrate the performance of our approach using real data and test problems available in the literature.

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Re*SEARCH* Dialogues 2022 Online Program

Determination of Propeller Thrust using Pitot Probes and Momentum Theory
Jacob Jenkins

Propellers are a necessary source of propulsion for aircraft with each design being unique to itself. Because of a propellers complex geometry, it can be difficult to determine specific thrust characteristics. In the implementation of a UTC Fluid Mechanics Laboratory experiment, pitot probes are used to determine the thrust of a propeller by surveying the downstream flow field and then making integrated calculations of Froude's Theorem for actuator disks and propellers. The results obtained from the calculations are compared to thrust values from strain gauge load cells that are integrated into a thrust stand.

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Developing a Predictive Geospatial Habitat Model for Green Salamanders (Aneides aeneus) in Tennessee.
Erin Gaylord

Green Salamanders (Aneides aeneus; Cope and Packard, 1881) are a secretive and cryptic species of salamander that can be relatively difficult to detect, due to their occupation of arboreal habitats. As a result, their populations are not well studied in Tennessee. The incorporation of geospatial tools is critical in developing models that can be used to predict undocumented locations in Tennessee and elsewhere. Determining prime habitat by identifying key variables for the species could offer insight on their status in the state and the aid in identifying the various threats that these populations face. The objectives of this study are to: locate potential populations of A. aeneus in Tennessee, to better understand and recognize the habitat variables that are necessary for the species to be present, to acknowledge suitable habitat that may be uninhabited by the species, and to potentially gain insight for future studies on their patchy distributions. Sites deemed to have high habitat specificity and increased probability of occupancy will be assessed and a habitat structure analysis will be conducted using various data sets. Paired Logistic Regression, Maxent, Circuitscape, and Akaike's Information Criteria will be used to evaluate model performance in the real-world. In closing, integrating geospatial tools for measuring and monitoring rare biodiversity is necessary to develop adaptive conservation and management strategies.

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DG Methods for Solving PDE Mathematical Models of Biological Processes
Daniel Acosta Soba

Partial Differential Equations (PDEs) are a widely used mathematical tool for modeling real-life processes. However, translating what we understand as "real world" into mathematical abstract models is not a simple task. Neither it is the resolution of these models to obtain meaningful data that might help us to understand the process or make predictions. In this talk, we present some mathematical models using PDE with special focus on biological processes such as tumor growth and cell migration. Moreover, we introduce the Discontinuous Galerkin (DG) methods for computationally solving these models. Finally, we illustrate both the models and the computational techniques with some numerical tests.

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Re*SEARCH* Dialogues 2022 Online Program

Digital Badges in Online Courses and Programs
Layne Bryant

Digital badges are validated symbols of one's knowledge, skills, or abilities. These microcredentials have been used to signify achievement in continuing education and training settings for years; however, some higher education institutions have also started incorporating badges into academic programs. This review of peer-reviewed studies published from 2017-2022 aims to present a detailed examination of the rationale for using badges in the online educational environment, including student motivation, engagement, and satisfaction. The findings from this synthesis can help online faculty, instructional designers, and distance education administrators determine how to implement digital badges effectively in online courses and programs.

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Re*SEARCH* Dialogues 2022 Online Program

DIP: A Log Parser based on "Disagreement Index Token" Conditions
Daniel Plaisted

Certain classes of log analytical models, such as those for log anomaly detection, require as inputs sequences of parsed log messages
in which the message tokens that belong to the template of the message are indicated. For this reason, it is common for such a model to employ a log parser, a program that detects the template of each message in a log file. It has been shown that even the most accurate log parsers in the literature fail to achieve high accuracy at detecting the templates of messages from certain systems' log files. This paper presents DIP, a tree-based log parser. The primary methodological innovation of DIP lies in the mechanism it uses to determine whether pairs of very similar messages have the same template. While many existing parsers only consider the percentage of matching tokens between two similar messages in determining whether they have the same template, DIP considers in addition the actual tokens at which the two messages disagree, deeming a pair of similar messages to have the same template if and only if each of those tokens satisfies one in a certain set of three conditions. Our experimental results show that DIP can achieve an average accuracy that is superior to that obtained by each of the 13 parsers tested in a 2019 survey study on log parsers. Furthermore, we give evidence that it achieves this high accuracy without compromising in terms of runtime.

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Re*SEARCH* Dialogues 2022 Online Program

Direct Nonoxidative Methane Conversion to Ethylene Over Plasma-Assisted Atomically Dispersed Pt Catalyst
Olumide Ayodele

One of the holy grails of catalysis - direct nonoxidative methane conversion to ethylene is resolved in this study using dielectric barrier discharge plasma (DBDP) assisted catalysis. Motivated by the formation of ethane and very low amount of ethylene in the DBDP over acid or base treated kaolin supported Ni and oxalate ligand functionalized Ni in CO_2 reforming of methane wherein Ni catalysts that were calcined at 800 °C showing higher methane conversion ($\boldsymbol{X}_{CH4}$), ethylene to ethane ($C_2=/C_2–$) ratio, and hydrogen yield ($\boldsymbol{Y}_{H2}$). A novel CeO_2 confined atomically dispersed Pt supported on oxalate ligand functionalized Cu modified zeolite Y catalyst (PtCe/CuX-ZY) was synthesized to exhibit strong-metal-support interaction, which rendered the d-band center

far away from the Fermi level, densification, and localization of d electrons thus weakening the adsorption of C_2H_4 upon formation to prevent subsequent hydrogenation to ethane. The novel PtCe/CuX-ZY catalyst showed an impressively high average $\boldsymbol{X}_{CH4}$, $\boldsymbol{Y}_{C2H4}$, and $\boldsymbol{Y}_{H2}$ of 73.5%, 23.9%, and 33.8%, respectively with a high $C_2=/C_2-$ ratio of *ca*. 12.3 compared to an average of 0.032 observed over Ni-based catalysts. This finding is impressive and opened up a further investigation in both academia and the industry.

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Re*SEARCH* Dialogues 2022 Online Program

Discovering, Counting, and Summarizing the National Park Specimens at UCHT
Samantha Doss-Watson

The herbarium at the University of Tennessee at Chattanooga (UCHT) consists of ~50k specimens dating from the 19-teens through the present. General use of the collection led curators to notice many specimens from within the boundaries of several National Parks, from the Great Smoky Mountains National Park to Rocky Mountain National Park to Banff National Park in Canada. While UCHT was a lead herbarium for the 2014 SERNEC specimen digitization effort and skeletal label data were transcribed for these specimens, it was not possible at that time to denote them as being from a National Park. In this study, we are searching UCHT for specimens from National Parks and transcribing additional label data as well as ranking the deterioration of these specimens so we may summarize these aspects of UCHT. Initial data from ~25% of the herbarium have revealed over 500 specimens from National Parks. Of them, 43% were only indicated as such in the locality string and 87% are in excellent condition. At this time, we project UCHT to hold ~2000 specimens from National Parks, which are in very good condition.

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Re*SEARCH* Dialogues 2022 Online Program

Does cognitive control affect successful "sandbagging" of concussion symptoms?
Melissa Materia

The value of concussion baseline assessments is dependent upon athletes giving their best effort. If an athlete fakes poor performance or “sandbags”, a future injury may go undetected. Therefore, the purpose of this study was to determine if the SportGait concussion baseline assessment detects differences between participants instructed to sandbag and those who are not. Furthermore, I examined whether participants’ cognitive control is related to their ability to fake poor performance on SportGait. Forty-four participants completed two cognitive control tasks, were randomly assigned to “sandbag” or do their best and completed the SportGait baseline concussion assessment. Results revealed that “sandbagging” participants endorsed more concussion symptoms, made more errors on the CPT-3, and demonstrated lower stride power in their gait. However, cognitive control did not predict sandbagging performance. Together these results indicate that SportGait detects sandbagging, but additional investigation of factors including the impact of coaching on faking behaviors is needed.

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Re*SEARCH* Dialogues 2022 Online Program

Does the Sexual Assault Prevention Program through the University of Tennessee at Chattanooga improve awareness and prevention of sexual assault on campus among students?

Kailey Harness, Abigail Randolph, Jessica Knott

This research study is designed to explain how the Sexual Assault Prevention program contributes to a college students' knowledge on how to recognize a sexual assault, and how to report it appropriately. Research on sexual assaults on any given college campus is limited, as the reporting rate is low (Cantor et al., 2015).Therefore, this study will exemplify the importance of the Sexual Assault Program and determine if changes need to be made in order to ensure that the knowledge learned is retained.

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Re*SEARCH* Dialogues 2022 Online Program

Doing Unto Others: Concept of God and Prosociality
Spencer Baker

There is a longstanding tension between religion and psychological science. While early thinkers in psychology reflected at length about religious experiences and principles, most experimental psychology steers clear of religious beliefs and motivations. Recent advances in evolutionary theory give us new tools for investigating how religious beliefs develop, adapt, and shape behavior. This research investigates the ways that a person's concept of god influences their social trust, prosocial behavior, and willingness to cooperate, and critiques the generalizability of other recent work on the subject.

This project is in dialogue with recent work in the evolutionary psychology of religion. A large body of work indicates gives support to the divine monitoring hypothesis: when religious people feel as if god is watching them, they cheat less, share more, and follow established social norms. This effect has been used to explain the evolution of religions across societies. However, religions differ greatly in the attributes that they ascribe to the divine. Some recent work suggests that more punitive conception of God are related to greater prosociality, while more personal conceptions of god are related to less punishment of those who break group rules.

Data for this project were gathered from the first five phases of the Baylor Religion Survey. These open-source datasets include measures of divine concept, along with a variety of other religious, political, and sociological variables, making them ideal for analysis. Datasets were examined for correlations that would be predicted by current theories about the relationship between personal, punitive conceptions of god and behavioral variables. Across all datasets, patterns of greater prosociality were not significantly related to god concept when controlling for age. This is a serious challenge to the generalizability of the effects observed in other studies.

Discussion for this project centers around generalizability, avenues for future research, and the relationship between trait-level religious characteristics and religious priming effects. Research designs will be discussed that may mitigate the effect of demand characteristics and religious priming in future research.

This will be measured using tools from game theory, which is the study of how people make decisions in relation to each other. Participants will describe the traits that they associate with god: attributes like benevolence, wrathfulness, omnipotence, etc., and will then participate in one of the most famous game theory scenarios: the dictator game. Willingness to share resources in the dictator game and willingness to punish others who choose not to share are both robust measures of prosocial behavior. I hypothesize that belief in a punishing god will predict more cooperation, and more punishing behavior, but only if that God is seen as personal and involved.

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Re*SEARCH* Dialogues 2022 Online Program

Drones: Smart Cities Cooperative Transport/Swarming
Jennifer Miles

Research experiences with programmed drones described here are translated into project-based learning (PBL) modules for teaching high school students history, python programming and STEM concepts. The authors, a history teacher and a career technical education teacher, leverage the additional knowledge and skills they gained through research activities to create integrated lessons that include learning how unmanned aerial vehicles—drones—are used for a wide variety of purposes, the history and impact technology has on society, the basic parts of a drone (especially using the brand named Crazyflie), and the mechanics and engineering underlying drone operation and coding for control and other purposes. By interacting with real drones and comparing them to "swarming" organisms, such as bees and ants, students will learn the basic principles of aerodynamics and cooperative transport. In addition, students will learn about "crazy" ants and how they can haul food much larger than themselves, by working in a cooperative transport and signaling to their other partners to guide and lift. Students will then explore other types of unmanned vehicles, including submersibles, and consider legal and ethical questions around this type of technology. Other subjects the research experience makes possible to teach in the lesson modules include computer programming, communication, aerial mapping, basic business principles, geometry, and SDC World History. Finally, students will apply what they have learned and think about how they would use aerial unmanned vehicles! Teacher's research experiences and PBL training will help students gain skills in all four STEM areas: science, technology, engineering, and mathematics.

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Re*SEARCH* Dialogues 2022 Online Program

Ecosystem Function of Urban Bioretention Gardens: A Study of Decomposition
Ashley Preast

Understanding the ecological role of bioretention gardens is key to managing urban environments that are characterized by increased impervious surface, higher ambient temperatures, and water runoff. Bioretention gardens designed to include native plants may serve multiple purposes in providing native habitats and nutrient turnover, in addition to water quality management. Students in the Fall 2021 ecology lab conducted a semester-long study comparing decomposition rates in and outside the bioretention gardens. The results show that decomposition varies significantly in and outside the gardens, but the effect likely depends on other physical properties of the environment.

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Re*SEARCH* Dialogues 2022 Online Program

Effect of COVID-19 on the Mental Health of College Students
Viktoriya Marushka

COVID-19 has impacted the world greatly, leading researchers to be interested in the virus's relation to mental health among various settings. Repeated isolation due to quarantining and virtual school platforms created a change in academic approach for students across college campuses and is thought to have negatively influenced their mental health. This study anonymously surveyed students from Lee University on their mental health over the course of their COVID-19-influenced college experience, regarding their motivation, sleep patterns, and physical activity levels, to determine how students had been affected. Participants shared insights into whether they believed they looked after their mental health well during the school year, noting their attitudes and ways in which community and activity helped maintain a balanced mental health status. Findings conclude that although most students said that their academic year was not affected by COVID-19 in a drastic way on Lee University's campus alone, students still agreed that their college experience and outlook on mental health was influenced by the pandemic in some way. These outcomes can provide small universities

a better understanding of student experiences during COVID-19 to proactively meet the needs of students moving forward.

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Re*SEARCH* Dialogues 2022 Online Program

Effectiveness of Community School Programming in Suburban Communities
Tiffany Patterson

The community school movement was sparked by the pragmatic philosopher John Dewey in the early twentieth century as he believed that schools should not just be a place where students gather to learn grammar, mathematics, and history, but that schools should teach children how to thrive in their social environment using what is learned in the classroom (Green & Gooden, 2014). In 1896, educational theorist Dewey developed a Laboratory School at the University of Chicago in which he, "sought out such cooperative relations in deliberately created communities dedicated to change, experimentation, and social reform," (Durst, A., 2010). The work of Dewey laid the foundation of logical solutions to not only in, but out-of-school factors that made it difficult for children to focus on learning activities at school.

Historically community school programs have primarily been in urban communities despite similar student barriers to learning in suburban communities such as the need for a structured environment after school, access to tutoring assistance, truancy, food insecurity, untreated mental and behavioral health conditions, and the need to develop healthy social emotional learning skills.

This presentation explores the effectiveness of a suburban community school program's efforts at addressing students' in and out of school factors which create barriers to education by interviewing school administration, teachers, parents, the school social worker, school resource officer (SRO), and the community school coordinator to gain their perspectives of whether the community school program has improved student outcomes.

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Re*SEARCH* Dialogues 2022 Online Program

Effectiveness of the Kinesiology Tape on Shoulder Pain and Function in Patients with Ehlers-Danlos Syndrome
Becky Bandy, Laurie Graves, Nolas Seay, David Levine, Frank Tudini

Ehlers-Danlos Syndromes (EDS) are a collection of inherited connective tissue disorders that often lead to generalized joint hypermobility, dermal dysplasia, and vascular or internal organ fragility. The hypermobility type of EDS (hEDS) is one of the most common forms of EDS and is associated with musculoskeletal pain and impaired function. An estimated 85% of patients with hEDS experience shoulder pain, yet there is limited research showing the beneficial effects of physical therapy on patients with EDS with shoulder pain. Interventions such as kinesiology taping (KT) have demonstrated improvements in pain, muscle activity and range of motion (ROM) in conditions such as hemiplegic shoulders and athletes but not in an EDS population. The purpose of this pilot study was to investigate the short-term effects of kinesiology taping on shoulder pain and active ROM in individuals with hEDS.

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Re*SEARCH* Dialogues 2022 Online Program

Effects of Equation of State on the Stably Stratified Turbulent Flow within a Channel
Steven Thompson

Stratified turbulent flows are observed in several engineering, geophysical and environmental flow systems, and therefore, the study of such flows is of great interest. Stably stratified turbulent flows observed around underwater naval applications have density stratification dependent upon two scalar fields, namely, temperature and salinity through an equation of state (EoS), which, in general, can be nonlinear. Furthermore, the differences in the molecular diffusivity of these scalar fields can lead to the occurrence of a differential diffusion phenomenon, which affects the evolution of the flow field. Numerical investigation of such flows is challenging due to the added complexity of the effects of stratification on the dynamics of turbulence. Turbulent flow exhibits the presence of a wide range of spatial and temporal scales and complex nonlinear interactions, and the presence of stratification furthers this complexity by affecting the small-scale mixing, large-scale circulation, the inter-scale interactions. In this study, we employ direct numerical simulation as a tool to examine the effects of the EoS on the evolution of stratified turbulent flow without the effects of differential diffusion. We simulate four cases corresponding to fully developed stably stratified turbulent flow within the periodic channel flow configuration at a fixed frictional Reynolds number of 395, and at two values of the frictional Richardson numbers of 0 and 60, characterizing neutral (unstratified) and stratified conditions. The effects of EoS are characterized in terms of the use of a linear and a nonlinear EoS. The results from the simulations are analyzed in terms of instantaneous and the statistical features of the flow and the scalar fields, and other quantities of interest relevant to the broader class of stratified flows.

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Re*SEARCH* Dialogues 2022 Online Program

Effects of Thick Ice Plate on Acoustic Wave Propagation in an Ocean
Mohammad Khan

We consider acoustic wave propagation in a layered ocean waveguide covered by thick ice. Unlike the case of pack ice, the thick ice cover has non-zero cylindrical rigidity which depends on a quantity called Young's Modulus which varies with the change in temperature. The problem of acoustic wave propagation is formulated as the boundary value problem for the Helmholtz equation subject to the boundary conditions on the rigid bottom and ice-covered top. With the help of the separation of variables method, we obtained the Sturm-Liouville problem which enabled us to find the two leading modes that are the separated solutions for two maximal eigenvalues. We found the asymptotic formulas with the help of the analytical results, and we developed a numerical algorithm that allows, for a given profile of the speed, to evaluate the frequency dependence of the leading wavenumbers. Based on the results of pack ice, we predict that the numerical results would be in complete agreement with the analytical results and the wavenumbers would not demonstrate a strong dependence on the speed profile. Our results could allow tracking of long-term variations of the ice properties such as changes in the thickness of an ice cover. Hence, we can obtain new results about the impact of global warming, seasonal changes, and other geological and environmental factors on ice covers. This research project was in collaboration with Dr. Boris Belinskiy and Dr. Lakmali Weerasena from the Department of Mathematics, and it was partially funded by the SimCenter at the University of Tennessee – Chattanooga.

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Re*SEARCH* Dialogues 2022 Online Program

Emotional Intelligence and Self-Care
Bernadette DePrez

Understanding and managing emotions in yourself and others helps to manage behavior, navigate social situations, and achieve positive results. Improving Emotional Intelligence skills positively contributes to job performance and positive management of relationships. The aim of this project is to work on strategies with

faculty and staff to improve Emotional Intelligence skills through education, reflection, and discussion. Participants will complete a pre- and post- self-assessment of Emotional Intelligence skills using the TalentSmart Emotional Intelligence Appraisal. The Emotional Intelligence Appraisal is used with permission from TalentSmart.

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Re*SEARCH* Dialogues 2022 Online Program

Enhancing Relationships Between Communities and the Police: Expanding the Use of De-escalation Skills
Greg Coker

The purpose of this research is to examine existing literature on verbal de-escalation skills used by law enforcement and to determine if those skills apply to enhancing the relationship between law enforcement and the community. The specific focus of the effort is to determine if it is beneficial to associate the synthesis of these skills with everyday interactions with the public. The relationship between and view of the police by the communities they serve may suffer long-term damage as the result of decisions made by one or two officers during emergency situations. Used successfully to achieve positive outcomes when helping people deal with an emotional crisis, it is hypothesized verbal de-escalation skills may improve rapport and trust between law enforcement and communities. Background literature on the use of de-escalation reflects convincing benefits. The research will compare the use of de-escalation skills to literary discussions of effective, positive leadership and organizational interactions. This comparison may draw a nexus that bridges the de-escalation skills to promoting positive relationships outside of crisis intervention. The benefit of improved, long-term cooperation between the public and law enforcement may translate to enhanced continuity of service even in times of uncertainty.

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Re*SEARCH* Dialogues 2022 Online Program

Estimating Load-Deflection Characteristics for the Shaft Resistance ofPiles Using Hyperbolic Strain Softening
Don Warrington

Hyperbolic soil modelling and strain softening have become better understood in recent years; however, their application to modelling load-deflection characteristics for the shaft of both bored and driven piles is in the early stages of development. This paper proposes a method that is based strictly on the strain-softening changes in shear modulus that is experienced to varying degrees around the pile shaft. A dimensionless method is proposed which can be transformed to a physical estimate using simple soil parameters.

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Re*SEARCH* Dialogues 2022 Online Program

Evaluating Reading 360: A Mixed Methods Approachthods Approach
Emily Rakoczy, Tuba Abbasi, Kaelyn Bishop, Christina Craig

Reading 360 is a current program being implemented by the Tennessee State Department of Education as a way to increase literacy rates in elementary schools. The objective of the Reading 360 program is to have children increase student reading proficiency by grade three (Tennessee Department of Education, 2020). We are proposing to evaluate the Reading 360 program using a program-oriented approach in order to describe the program's efficacy and assess the ease of implementation. The Reading 360 program evaluation would use

a mixed-method approach due to the qualitative and quantitative information needed to evaluate the overall effectiveness of the literacy program. Based on the overarching question in the evaluation to determine if the Reading 360 program is effective in raising literacy in the state of Tennessee, utilizing mixed methods can increase the validity and overall understanding of the evaluation (Fitzpatrick et al., 2017). Triangulation, a form of mixed methods, can be used in this evaluation to increase the validity and accuracy of the measure used (Fitzpatrick et al., 2017). By evaluating the Reading 360 program, we will have a better understanding of the characteristics, efficacy, and implementation cost which will better inform schools on the selection of this program.

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Re*SEARCH* Dialogues 2022 Online Program

Evidence suggesting the seasonality of COVID-19
Hong Qin

Correlation between weather and the transmission of SARS-CoV-2 may suggest its seasonality. We examined the cointegration of virus transmission with daily temperature, dewpoint, and confounding factors of mobility measurements during the first year of the pandemic in the United States. We examined the cointegration of the effective reproductive rate, Rt, of the virus with the dewpoint at two meters, the temperature at two meters, Apple driving mobility, and Google workplace mobility measurements. Dewpoint and Apple driving mobility are the best factors to cointegrate with Rt. The optimal lag is two days for cointegration between Rt and weather variables, and three days for Rt and mobility. We observed clusters of states that share similar cointegration results, suggesting regional patterns. Our results support the correlation of weather with the spread of SARS-CoV-2 and its potential seasonality.

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Re*SEARCH* Dialogues 2022 Online Program

Examining the Burnout among K-12 Teachers During COVID-19
Abigail Goncalves, Emma Carter , Jessica Thomas, Tiffany Smith, Hannah Jacky

- **Background:** The problem is burnout in teachers during COVID-19. The investigation about how the factors affect burnout provide some suggestion on how to improve the school policy or support K-12 teachers during COVID-19.
- **Literature Review**: Past research has shown emotional exhaustion, depersonalization, and low personal accomplishment as ways burnout has manifested in teachers as they work to overcome barriers for students (Näring et al., 2006). Data gathered on teacher burnout during Covid-19 has been limited, however, recent research has found that teachers reported burnout in relation to professional efficacy, (Sánchez-Pujalte et al., 2021) instruction modality (Obrad, 2020), communication with caregivers and lack of school support (Pressley, 2021).
- **Purpose**: The purpose of this study is to examine burnout in K-12 teachers during the COVID-19 pandemic in hopes of better understanding and assisting teachers with tools to combat burnout and promote retention. Educators are valuable frontline workers that deserve policies to support the important work they do.

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Re*SEARCH* Dialogues 2022 Online Program

Examining the Perceptions of Voter Rights Denied and Support for Voter Rights
Jennah Hyppolite, Sherah Basham, Chris Acuff

Democracy is fundamentally grounded in the people's right to vote, but what happens when the mechanisms meant to protect the electoral process become barriers? This study examines voter opinions on felon voting rights and voter restrictions and perceptions of the denial of voter rights. Specifically, how do attitudes about requiring an ID to vote IDs and felon voting rights compare to perceptions about how often voters are denied the right to vote? This study uses a sample of 3,488 respondents from the American National Election Studies (ANES) 2020 Times Series Study. Utilizing multinomial logistic regression, we analyze the influence of voter support for felon rights to vote and voter ID requirements on perceptions of how often voters are denied the right to vote. Findings indicate that the frequency with which voters perceive that people's right to vote is denied, their support for requiring an ID to vote decreases, and their support for permitting felons to vote increases. Additionally, perceptions of how often voters are denied the right to vote vary by age, race, sex, education, social class, region, and 2020 presidential vote. Implications of support for voter rights and perceptions of voting rights denied are discussed.

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Re*SEARCH* Dialogues 2022 Online Program

Examining the Relationship Between Resilience and Perceived Stress in Undergraduate Nursing Students at UTC
Anna Machado, Lindsay McDonald, Jenny Holcombe

The purpose of the current study is to examine the relationship between resilience and perceived stress in undergraduate nursing students at UTC. Data will be collected via an anonymous Qualtrics survey link emailed to all current undergraduate nursing students in Spring 2022. Data will be analyzed via descriptive statistics and correlations using SPSS v28. Understanding the relationship between resilience and perceived stress could prove useful in providing resources and resilience training to undergraduate nursing students during the most crucial phases of their program of study.

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Re*SEARCH* Dialogues 2022 Online Program

Experiences of Employees with Chronic Health Conditions During the COVID-19 Pandemic
Stephanie Penpek

Although workers with chronic health conditions have received little attention in past Industrial-Organizational Psychology research, the COVID-19 pandemic has brought new concerns for the workplace safety of these employees. I applied the JD-R model to a sample of 143 workers with chronic conditions, looking at how prevalent demands and resources impacted levels of burnout and emotional well-being. Quantitative analyses supported that job demands (i.e., devaluation and job insecurity) were generally related to negative health outcomes, while job resources (i.e., support and flexibility) were related to better health outcomes. Results also indicated that the impact of demands and resources on health might vary based on condition characteristics, such as visibility. The results of this study can help organizations better understand the unique impacts of job demands and resources for those with chronic health conditions. With this information, organizations can create more appropriate interventions and accommodations for this workplace population

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Re*SEARCH* Dialogues 2022 Online Program

Exploiting Metallohinged *trans*-bidentate Ligands for Cross Coupling Reactions
Brandon Nessell

The synthesis of carbon-carbon bonds is an important chemical reaction for several industries, such as pharmaceuticals. *Trans*---bidentate ligand systems are rare but have been found to improve catalytic activity; for example, the *trans*--bidentate ligand 1,2-bis(2-pyridylethynyl)benzene improved the activity of palladium in the Heck reaction. Our group is interesting in exploiting transition metal hinges to generate *trans*-bidentate ligands. It was previously found that $Cp^*_2Ti(C_2$2-py$)_2$ (where $HC_2$2-py = 2-ethynylpyridine) is able to act as a *trans*-spanning ligand with Pd(II). Herein, we describe the synthesis and characterization of the metalloligand $Cp^*_2Ti(C_2thio)_2$ (where HC_2thio = 2-ethynylthiophene). Using the titanocene $Cp^*_2TiCl_2$, $Cp^*_2Ti(C_2thio)_2$ was synthesized in 62% yield. The system was then characterized using ^{1}H and ^{13}C NMR spectroscopy, cyclic voltammetry, and IR spectroscopy. Copper (I) iodide was then inserted into the titanocene system, creating $Cp^*_2Ti(C_2thio)_2CuI$ in 79% yield. The resulting copper inserted species was characterized using ^{1}H and ^{13}C NMR spectroscopy, IR spectroscopy, and single crystal Xray crystallography. Attempts were made to insert Pd(II) in a *trans* fashion, but none have been successful. Future work will go towards testing the compatibility of $Cp^*_2Ti(C_2thio)_2$ and $Cp^*_2Ti(C_2thio)_2CuI$ in cross-coupling reactions.

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Re*SEARCH* Dialogues 2022 Online Program

Exploring Counseling Services Use and GPA for First Generation College Students and Continuing Generation Students
Audrey Buettner, Madelyn Caldwell, Morgan Donnelly, Abbey Jones, Kendal Robinett

First generation students are defined as students whose parent(s) did not receive more than a high school diploma (Pascarella, et. al, 2016; Gilfillan, 2019) compared to continuing-generation students whose parents did attend college. First generation students have more difficulty getting to college and difficulties in college because they do not have access to the same resources as their continuing generation peers (Pascarella, et. al, 2016; Gilfillan, 2019). Counseling services aid students in studies during college. Every student can seek out services, however students of a minority population tend to not seek out counseling services such as group therapy and individual therapy (Stableton, M. J., Soria, K. M., & Huesman, R. L., 2014; Smith, K. M., Chesin, M. S., Jeglic, E. L., 2014). The reason for conducting this research is to determine rates of counseling services used among first generation college students and continuing generation students, and to compare the grades of first generation college students and continued generation students. The findings in this study indicate a relationship students GPA and their feelings about their grades. If a student has strong feelings about their grades, then they will have a higher GPA. There was no significant difference between the counseling center use of first generation students and continuing generation students; the data shows first generation students do not utilize the counseling services available to them on campus.

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Re*SEARCH* Dialogues 2022 Online Program

Exploring Intra-Household Food Insecurity Experiences in Southern Ethiopia
Breanna Evans

Gamo families of southern, rural Ethiopia live in harsh environments and may experience times of food insecurity (FI). While FI is a household level measurement, perceptions and experiences related to the condition may be viewed differently between Gamo spouses due to various sociocultural norms. To explore potential differences in perceptions and experiences of FI between Gamo mothers and fathers. Semi-structured interviews were conducted with Gamo dyads (n=33) of mothers and fathers exploring parental

perceptions and experiences related to various environmental factors, including household FI. Using a basic inductive analytical framework, two coders used an iterative, data-driven analysis process to independently apply codes to transcripts within NVivo. Next, the coders applied discourse analysis tools including I and we statements, and position design and identity building to transcripts. Over 75% of participating mothers and fathers (n=25 dyads) agreed on household food security status with their spouse. Of those 25 dyads in agreement, n=21 reported some indication of FI. While both mothers and fathers reported various FI-related barriers and coping strategies, fathers used I statements (n=29 statements) more often to describe their FI experiences compared to we statements (n=8 statements). In some cases, intra-household FI experiences varied between mothers and fathers. With the differences noted between Gamo mothers and fathers, interventions/policies aimed to improve FI may need to include gender-specific elements.

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Re*SEARCH* Dialogues 2022 Online Program

Exploring Predictors of COVID-19 Vaccine Acceptance Among Students, Faculty, and Staff on a Southeastern University
Abigail Hunt

The purpose of this study was to explore predictors of early COVID-19 vaccine acceptance among students, faculty, and staff on a university campus in the Southeast. A cross-sectional anonymous survey was distributed via email through an internal listserv to all students, faculty, and staff on the university campus from September to October 2021 using online survey software (QuestionPro). The 49-item survey explored COVID-19 vaccine related experiences, perspectives, and knowledge, and sociodemographics. Descriptive and inferential statistics were calculated in SPSS 28.0. Participants were divided into two groups, vaccine hesitant or early vaccine adopter. A binary logistic regression was used to examine the association between independent variables and vaccine adoption status. The sample (n=1,234) was made up of 55% students, 24% faculty and administration, and 20% staff. Nearly 85% of participants were early vaccine adopters. Based on the binary logistic regression model, participants who identified as Democrats (OR=4.3, p=<.001), reported never having a positive COVID-19 test/diagnosis (OR=2.5, p=<.001), noted seeing/hearing COVID-19 misinformation (OR=1.8, p=0.27), and those reporting trust in public health officials (OR=26.2, p=<.001) were more likely to be early COVID-19 vaccine acceptors, compared to Republicans, those who reported having a previous positive COVID-19 test/diagnosis, those who had not seen/heard COVID-19 misinformation, and those reporting distrust in public health officials, respectively.

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Re*SEARCH* Dialogues 2022 Online Program

Exploring the Student Experience in Foreign Language Learning
Shelby Exline

The majority of students in Tennessee are required to study a foreign language at some point, however many do not continue to use the language after finishing their required courses. In this research study, college-aged students of different backgrounds, different years of studying a foreign language, and with different experiences were asked questions about their previous foreign language studies, including their experiences with their teachers, and how successful they felt they were, along with what encouraged or discouraged them to continue. A thematic analysis of the interview results will be carried out, and based on that analysis, suggestions for educators will be given regarding how best to encourage students to want to continue in foreign languages studies.

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Factors Associated with Predicting Student Success in Certified Registered Nurse Anesthetist (CRNA) Programs
Marclyn Porter

The following study addressed the identified gaps in the literature with regards to graduate nursing students and the role critical thinking plays in developing a predictive model of student success in CRNA programs. The population for this study included individuals who provided application data to an master's level CRNA program between the years 2014-2018. The study participant sample included those candidates who were interviewed, offered a position, and started the CRNA program, and those candidates who were interviewed, yet failed to advance past the interview stage. Subsets of the sample population included students who successfully completed the CRNA program between the years 2016-2020 and those who did not. The quantitative nonexperimental study utilized existing data from admissions materials; self-reported data such as personal demographic attribute variables; and third-party verified data such as undergraduate and graduate grade point averages, Graduate Record Exam (GRE) scores, Health Sciences Reasoning Test (HSRT) scores, and National Certification Exam (NCE) scores. Findings indicated that critical thinking aptitude, as measured by the HSRT assessment, was a significant predictor of on-time completion. A statistically significant positive association was also found between HSRT scores and students' NCE exam scores. Results indicated that the development of a statistically significant predictive model comprised of multiple variables was possible. Two independent variables indicated statistically significant predictive relationships with programmatic success, time away from school prior to enrolling in graduate programs and HSRT percentage scores.

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Re*SEARCH* Dialogues 2022 Online Program

Factors of Opting-out of K-12 School Mask Mandates in Hamilton County, Tennessee
Sherah Basham, Sue Gouge

This study examined the factors that influence parents/guardians to opt their student out of wearing masks, in accordance with COVID-19 mask mandates in Hamilton County K-12 Schools, in Tennessee, USA. Using ordinary least squares regression, findings demonstrate that schools a higher percentage of White students and those with higher percentages of students with disability were significantly associated with a greater percentage of students opting out of wearing masks, whereas economic factors were not influential.

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Re*SEARCH* Dialogues 2022 Online Program

Financial Hardship and Academic Performance
Nicole Burnette, Chelsie Stewart

The challenges that students face are financial hardship and academic performance through their college experience. In this research, we want to know if there is a relationship between financial hardship and academic performance among students at UTC ages 18 and older. Through this, we did a survey that measured academic status through GPA and financial stress level scale to show if they feel like they are having a hard time with their financial needs by running a Pearson correlation 1-tailed test on SPSS and an ANOVA test for the data analysis. The results show no significant relationship between stress of financial hardship and students' academic performance through their GPA. However, there was a relationship between students with students loans having a higher stress level.

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Re*SEARCH* Dialogues 2022 Online Program

Financial Planning and Financial Stress in College Students
Quinn Vinson, Kaylie Shelton, Erin Davidson, Kace Allen, Alexander Moore

The relationship between financial stress and financial planning in college students has been called into question. College students are influenced by many different factors that can contribute to or influence their financial stress. College students from many different schools have been studied, and a general lack of understanding of financial knowledge was found. This has been attributed to a lack of prior education, factors of intersectionality, and other related information. Not having a solid foundation for financial planning results in higher financial stress, which then negatively impacts other areas of the students' lives. There is a need for more financial planning resources on college campuses. Ecological Systems Theory shows that all of the systems college students interact with can contribute to their financial knowledge. A need for research on the relationship between financial planning resources and financial stress among college students has been highlighted the exploratory research done thus far, which informs this study's aims.

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Re*SEARCH* Dialogues 2022 Online Program

First Report of Meiofauna from the Tennessee River
FRANCESCA LEASI, Jessica Cline, Noura Elsaeed, Luke Qualey

The term meiofauna broadly defines small-sized animals (most results support marine meiofauna as a valuable bioindicator of environmental changes. However, research on freshwater communities is rare and scattered. This flaw is particularly evident in the Southeastern United States, a well-investigated area collectively known as a hotspot of biodiversity for bigger species, but also a hotspot of imperilment. However, almost nothing is known about freshwater meiofauna from the Southeast U.S. This work shows results obtained between 2019 and 2021 thanks to the contribution of research students working in Leasi's lab and students enrolled in Meiofauna Biodiversity (4770-5770 with Lab).https://symposium.foragerone.com/utc-research-dialogues-2022/presentations/41149

Re*SEARCH* Dialogues 2022 Online Program

Folding Patterns of APOA1 in Ionic Solution
LeeAnna Blackburn, Luis Sanchez

The apolipoprotein A1 (APOA1) functions to promote the movement of cholesterol and phospholipids from the inside of cells to the outer surface in order to combine with the protein and form a high-density lipoprotein (HDL). Ionic strengths in the environment surrounding a protein can influence the interaction of its residues and, ultimately, its tertiary structure. Due to this significance, APOA1 was studied through molecular dynamics simulations utilizing GROMACs in order to collect data on the folding of APOA1 while in aqueous solutions at varying ionic strengths of NaCl. The structural property of APOA1 was characterized through the radius of gyration in order to determine the conformation of the protein during the time progression of the simulation. It is hoped that research can lead to a better understanding of the ionic interactions that promote the configuration of APOA1 that better associates with cholesterol and fatty acids within the body.

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Food Insecurity Among College Students
Jawaad Sheikh

Food insecurity is a public health concern that needs to be addressed and can be improved. Many households in the U.S. are impacted by food insecurity and it is alarming to see the prevalence of food insecurity among college students is much higher when compared with the nation. Many people may not realize the severity of the issue, a study referred to food insecurity among college students as a "hidden problem" on campuses. The negative impacts that food insecurity can have on students' physical and mental wellbeing is too big to ignore. This project addresses food insecurity among college students by exploring initiatives that have already taken place to help alleviate the problem and most importantly, initiatives that have taken place at the University of Tennessee at Chattanooga (UTC). The methodology of this project included review of literature and evaluation of programs by accessing the library's data base sources and also by coordinating with an interdisciplinary team of professionals and staff members at UTC. Furthermore, this project aimed to help elevate Scrappy's Cupboard and Scrappy's Market by providing UTC students the proper educational components to compliment the food that they receive so that they can be more equipped and aware of how to make the most of the fresh/healthy food options. Scrappy's Cupboard is a food pantry that started operating in Fall 2017 after a need was recognized to address food insecurity which was affecting UTC students. The food pantry has recently expanded by adding a farmer's market on campus known as Scrappy's Market. Our findings highlight some important implications and initiatives that can help academic institutions such as UTC to improve students' access to food. It also provides students with easy and accessible resources which are relevant and innovative, to help them when they are in need.

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Re*SEARCH* Dialogues 2022 Online Program

Force Microscopy-Mediated Elasticity Determination of Ampicillin Resistant Escherichia coli Cells
Patrick Kenney

Abstract Antibiotic resistance is a global concern as mortality rates resulting from common infections caused by multi-drug resistant bacteria are ever increasing. In the present study, cellular membrane rigidity is examined as E.coli cells are exposed to ampicillin across multiple generations to elucidate the biophysics of antibiotic resistance. E.coli cells were cultured using standard methods before ampicillin exposure and atomic force microscopy was employed to determine the elasticity of the cells utilizing both Young's modulus and the Hertz model for contact stress. Despite observing significant differences in the slopes of force distance curves between ampicillin resistant generations of E.coli cells, results have yet to be fully quantified as the resulting best fit equations have not been fully deciphered.

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Re*SEARCH* Dialogues 2022 Online Program

From Birth to Post-Secondary Transition: Family, School, and Community Experiences for a Student With a Disability (from IFSP to IEP)
Jennifer Lynberg, Jason Gordon, Lorna Durrant, Krysta Murillo, Kim Wingate

- The panel will discuss information that provides family transition planning from the Individualized Family Service Plan (IFSP; Birth-3 y/o) to the Individualized Education Program (IEP; 3 – 21 y/o) and how it can impact family resiliency and functioning. Parents experience a shift from being more involved and having more autonomy in their child's services, within an IFSP, to an IEP where decisions seem to be more highly influenced by the school-based members of the team. The panel will discuss

how and why this shift may affect the family's resiliency. The panel discussion will include how family's needs and community resources to help them meet those needs are not a priority with an IEP like it is within an IFSP, which can impact functioning as a family unit. The panel will then shift into a discussion about how an IEP impacts school-age children and their families through the school year in which the student (child) reaches age 21 and when they are no longer eligible for public school services. Finally, the panel will address how teachers can best serve and support families of students who have IEPs. The panel will discuss preservice teacher training supports and modules as well as professional development that addresses future and practicing teachers' access to knowledge about family dynamics and transition services through the school-age years. The overall goal of the session is to help professionals prepare for IEP meetings with a better understanding of how to include, collaborate with, support, and advocate for, families and students when making educational decisions as a team

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Re*SEARCH* Dialogues 2022 Online Program

Gen Z vs Boomers as Jurors: Do Age and Media Type Influence the Effects of Pretrial Publicity on Verdicts?
Akera Williams

Concerns about Pretrial Publicity (PTP) have grown with the rise of the internet and social media, leading to a near impossibility of selecting a jury that can ignore PTP and focus only on facts presented at trial (Kline & Jess, 1996; Ruva & LeVasseur, 2012). In previous studies, participants exposed to negative PTP were more likely to find the defendant guilty, even when they were explicitly told to ignore PTP (Hope et al., 2004; Ruva & Guenther, 2015), and tended to misattribute PTP as having been evidence presented during the trial (Ruva & Hudak, 2013). To date, no research has examined age differences and the format of PTP or included other measures that may explain why PTP affects some individuals more than others. With the dramatic increase of PTP through social media, the effects of PTP source and format (text versus video) should be examined with a broader range of participants. This study compared jury verdicts among older and younger jurors when PTP is presented in different media formats.

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Re*SEARCH* Dialogues 2022 Online Program

Gender Identity in Ancient Scythia
Alex Furr

It is nearly ubiquitous in the popular Western imagination that misogyny and intolerance were omnipresent phenomena across human history. When considering classical studies, traditions of Greek and Roman discrimination toward women spring to mind. Slightly further east, however, in the Eurasian steppe lands of the Scythians, life for women was very different. In many Scythian tribes, women enjoyed an elevated status and were venerated by their society. They could transcend the typical housewife/child-bearer role assigned to so many women in the west to become mighty warriors and priestesses. Additionally, the enarei, a class of shamans born anatomically male who identified as female, were granted even greater reverence and served in essential roles in Scythian society. In this paper, I will be exploring the veneration Scythians showed to both those born anatomically female and enarei, as well as how heavily subjective Greek narratives may have influenced erroneous historiography.

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Re*SEARCH* Dialogues 2022 Online Program

Gesture Based Control of Collaborative Robots
Kenneth Kilgore, Randall Worley, John Vasquez

Through the use of OpenCV vision library and a raspberry pi4 with camera we have given this ABB YuMi robot the ability to recognize and respond to hand gestures. The system is python based and uses a GPIO for communication between the Pi and the ABB controller

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Re*SEARCH* Dialogues 2022 Online Program

GigCity Computer Science For All: A Research Practitioner Partnership
Robert Robbins, Stephanie Philipp

Education systems have yet to optimize computer science curricula, resources, and professional development despite the growth of the computer science industry. To combat this issue, research practitioner partnerships (RPPs) form collaborations between educational, community, and professional stakeholders to address barriers and develop plans of action. The GigCity Computer Science For All RPP is an NSF-funded initiative to address barriers to computer science learning specific to Hamilton County schools. Chattanooga's technology industry is growing rapidly as urban infrastructure, autonomous vehicles, and energy efficiency are being tested and developed. Unfortunately, Hamilton County has no district course pathway to prepare students to take advantage of and thrive in these career opportunities. The GigCity CS4All RPP aims to: improve student participation and achievement in CS, recruit and train educators, and establish a workforce with the knowledge and skills necessary to drive continued innovation in GigCity. We outline the current phases and research projects underway as a part of this initiative.

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Re*SEARCH* Dialogues 2022 Online Program

Global Voices in a Modern Pandemic
Allie Elmore, Hanna Wagers, Gavin Farmer, Fernie Cooper

Our group is researching literature published and produced during the initial onset of the Covid-19 pandemic. **How have people across the globe internalized and responded to Covid-19 through literature?** We are searching for changes to people's lives, especially related to work, family, money, and social dynamics. This project is a group effort of eight students that are currently taking Modern World Literature. We are seeking to investigate Modern World Literature in one edition of an undergraduate journal called *World Literature Today.* It is published and produced by undergraduate students like us by the University of Oklahoma. We chose this journal and edition based on the advice of our mentor because of its status as being a world renowned source for contemporary world literature. The edition we selected, Volume 94, edition 3, uncovers many ideas and experiences that people had to say about the initial onset of Covid-19 during the summer of 2020. We are finding that people, even early on, have been considering the effects that Covid-19 will have on literature. Our research will consider these effects and the immediate themes discovered within the publication related to humanity's common experience of Covid-19. Even the pieces of literature that do not specifically address Covid-19 seemed to be selected by the editors to engage with this experience of disruption. Some of the texts, such as the short story "Zoo Syndrome," by Sadaa Al-Daas discuss situations that are different from, but could be applied to, experiences many people have had with the recent pandemic. Our group is searching for connections between emotions and experiences of people through the written word across cultural and geographical boundaries.

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Green Salamander (*Aneides aeneus*) Relative Abundance and Proximity to Hiking Trails in the Greater Chattanooga Metropolitan Area
Nicole Cobb

Many people are attracted to the Greater Chattanooga Metropolitan Area because of the quality and quantity of outdoor recreation that is available to the public. Unfortunately, the popularity of outdoor recreation can increase the negative effects on the environment. Hiking trails can alter the landscape and influence wildlife behavior and relative abundance. Salamanders are sensitive to environmental disturbances due to their complex life cycle that often require upland and wetland habitats in juxtaposition. We aim to assess the effects of hiking trails on Green Salamander (*Aneides aeneus;* Cope and Packard, 1881) relative abundance by evaluating the various metrics encompassing usage, style, soil type, construction, and typology. Our area of study will be The Tennessee River Gorge, specifically the Ritchie Hollow Trail, PotPoint Nature Trail, and the Cumberland Trail. We will search for *A. aeneus* at predetermined intervals along each trail using 100m transects and a randomized blocks design. Habitat will be measured with both known and random points Habitat metrics will be recorded along with other geospatial data. Data will be analyzed using ArcPro GIS, SAS and SPSS. Data will be statistically analyzed using paired logistic regression and tested for normality. The conservation implications of this study are many and the results of this study will better inform practitioners to make wise land use decisions.

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Re*SEARCH* Dialogues 2022 Online Program

Hand Gestures controlled Hip Knee Ankle Foot Orthosis
Garrett Groom, Tyler Baker

Hip-Knee-Ankle-Foot Orthosis (HKAFO) helps support people with lower extremity disabilities. Using an HKAFO can help patients who are unable to use their lower extremities with standing and walking. They have also been found to help improve body alignment and posture. In this study, we have designed a prototype of a hand gestures controlled active HKAFO. The goal for this device is to help patients who have not lost the ability to walk completely have the freedom of walking and standing. The system is controlled by electromyography signals (EMG) from the wearable EMG system attached to the forearm. When the following motions are made by the patient's hand; fist, spread, wave left, wave right and double tap, the signal from the EMG armband is read by a Raspberry pi. Its own classification output is obtained for each signal. After the signal is read and classified by the Raspberry Pi, it sends commands to the onboard motor driver by Bluetooth communication. The motor driver then powers the servo motor, controlling the movement of the HKAFO. This allows the movement of the lower body with minimal input from the user. This prototype shows how the concept of active HKAFO controlled by EMG signals could provide better support and walking functionality than traditional HKAFO.

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Re*SEARCH* Dialogues 2022 Online Program

Heuristic Method to Add Corridors to Connecting Fragmented Groups
Christopher Collins

Biological conservation depends increasingly on the establishment of protected areas that include as many species as possible, and that are extensive, compact, and connected. Various optimization models have been developed to address each of these goals, often focusing on achieving a selection of these goals. The majority

of these models are complex models, thus finding the global optimal solution is problematic for large-scale real world problems. In this project, we focus on a heuristic approach to identify connected protected areas. Assuming that species are mapped across geographical region, we first identify core areas that are compact using some existing optimization models. We then identify contiguous corridors between these core areas based on costs and species conservation goals, allowing the judicious replacement of core elements where possible.

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Re*SEARCH* Dialogues 2022 Online Program

Housing Inequality
Darrell Walsh

This project comparatively examines the differential value of homes between African American homeowners and white American homeowners. The racial composition of geographical space within the housing market impacts the most significant form of wealth accumulation for most Americans. Because the correlation between wealth and racial inequality remains significantly high in the United States, continued scholarship on this topic is warranted to examine patterns and determine if housing inequality has undergone a positive or negative change over time. By concentrating on the time period from 1980 to 2010, this research rejuvenates a historical perspective of racialized practices impacting property values differentially. More specifically, this research examines housing prices in the state of Tennessee's four major cities (Chattanooga, Knoxville, Memphis, and Nashville) using decennial census data to quantify the house values over time in the selected cities. The major findings indicate ongoing and substantial negative change regarding home value outcomes for both African Americans and white American homeowners. The results inform policy recommendations for housing developers, insurance, banking, property assessment professionals, zoning board commissioners, and other economic and political actors who shape policies relevant to wealth and racial inequality in America.

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Re*SEARCH* Dialogues 2022 Online Program

Impacts of Self-Care on the Stress Level Among Parents with children who are diagnosed with ADHD
Montana Holland, Alaina Lovett, Victoria Pope

The purpose of this study is to examine how self-care practices can affect the stress levels of parents with children with ADHD. Based on our review of numerous peer-reviewed literature, it showed that parents of children with ADHD have higher stress levels than parents with children with no medical diagnosis of ADHD. It is important to evaluate stress levels and how much of an impact self-care activity could potentially have on parents of children diagnosed with ADHD. Our study is supporting previous evidence and finding new data to better inform parents of kids with ADHD.

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Re*SEARCH* Dialogues 2022 Online Program

Implementation of Multidisciplinary Rounding
Casey Adams

As healthcare resources are becoming more in demand, it is imperative that hospitals are discharging patients in an appropriate timeframe, meeting the geometric length of stay (GMLOS). Through MDR, patients, providers, nursing, and essential ancillary departments increase communication to assist in meeting the

GMLOS for patients, opening essential beds in the hospital for the ever-increasing number of ED boarder patients. MDR is utilized to decrease extended lengths of stay by increasing communication between the teammates and creating an individualized care plan for patients. Through MDR, disciplines can meet the GMLOS, decreasing the risk of adverse events to patients, and increasing staff satisfaction.

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Re*SEARCH* Dialogues 2022 Online Program

Improving Measurement of Student Learning
Jessica Taylor

In order to begin to evaluate the measurement of student learning, it was important to begin by taking a targeted approach to exploring learning in different contexts—formative and summative assessments, metacognition, co-curricular activities, experiential learning, and adaptive learning. Garcia et al (2021) note, it is necessary "to increase the extent to which assessment findings direct pedagogical and learning improvements, it is important to learn how instructors and institutions currently use data to define, track, evaluate, and improve student learning" (p.4).

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Re*SEARCH* Dialogues 2022 Online Program

Improving measurement of student learning
Jessica Taylor

Through the Grand Challenges in Assessment, the current work focuses on improving measurement of student learning in different contexts both inside and outside the classroom.

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Re*SEARCH* Dialogues 2022 Online Program

Improving Vaccination Awareness among Nurses and Healthcare Workers
Andrea Janoyan

Aim: The aim of this project is to improve the uptake of the routine vaccinations, including COVID-19 vaccination among healthcare workers (HCW). Current research related to routine vaccinations among HCW, including safety and efficacy will guide implementation of an online outreach initiative for HCW, especially nurses.
Background: Even though such evidence has been well documented in literature, HCWs vaccination rates are sub-optimal with deficiencies being risky for HCWs, patients, and indirectly affecting the community. With new vaccination recommendations, including COVID-19 vaccination, the time has come to focus on evidence-based strategies and recommendations to protect HCW and their patients.
Purpose: The purpose of this quality improvement project is to improve knowledge, vaccination hesitancy and confidence among RNs and HCW. The following question is posed: Among Tennessee Nurses who hold membership in the Tennessee Nurses Association and/or Sigma Theta Tau how does the implementation of an evidence based, virtual education program on recommended vaccinations for Healthcare Workers (HCW) affect intent to vaccinate, vaccine knowledge, confidence and hesitancy over six months.
Participants: Nurses and Healthcare workers (HCW) ages 18 and older.

Method: A quality improvement (QI) project with an educational intervention and a pre-test/ post-test design measuring Vaccine Hesitancy among nurses and HCW utilizing the Vaccine Hesitancy Scale (VHS) conducted virtually. Recruitment methods include Tennessee Nurses Association local District meetings and Sigma Theta Tau ETSU Chapter meetings (conducted virtually).
Data Sources: The literature search was conducted using CINAHL and PUBMED. Key words utilized included: health care workers, nurses, influenza vaccine, COVID-19 vaccine, immunization recommendations for nurses and healthcare workers, and vaccine hesitancy among healthcare workers.
Literature Review Results: Common themes within the literature for vaccine hesitancy among HCW were identified:
1) safety concerns of vaccination and/or its ingredient
2) religious or philosophical objections
3) fear of side effects and associated illness
4) lack of urgency
5) and sense that herd immunity will protect unvaccinated individuals from illness (CDC, 2021)
Conclusion: Increasing knowledge related to the efficacy and safety of the vaccines could lead to improved vaccination rates, healthier individuals and communities.

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Re*SEARCH* Dialogues 2022 Online Program

Instructional Therapeutic Play: An Evidence-based, High-fidelity, Simulation Training for a Pediatric Nurse Residency Program
Kathryn Jones

The purpose of this evidence-based, translational project is to address nurse graduates' lack of preparedness and competency in communicating with patients, specifically children. Current evidence supports simulation training in nurse residency programs as an integral intervention to strengthen nurse graduates' transition to practice. By incorporating a child's developmental level, instructional therapeutic play and therapeutic communication can best prepare children for painful procedures related to hospitalization. Simulation training as a component of a nurse residency program may be an effective strategy to enhance nurse graduates' therapeutic communication skills and caring self-efficacy while reducing traumatic hospital-related events for pediatric patients.

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Re*SEARCH* Dialogues 2022 Online Program

Investigating Interprofessional Understanding of Occupational Therapy
Annadele Benson, Abigail Glover , Anna Hardin, Heidi Smith, Erin Melhorn

Occupational therapy remains misunderstood between some healthcare professions we work with. We took this opportunity to research and educate our physical therapy peers and colleagues on the unique role that occupational therapists have on the interprofessional team. We did this via surveys given to the physical therapy students before and after a short educational session, and then compared the results following the educational presentation. Future recommendations include a lab experience between students along with the educational session.

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Re*SEARCH* Dialogues 2022 Online Program

Investigating the Long-Term Effects of COVID-19 on Occupational Performance
Rebekah Aranda, CaraBeth Swafford, Hayden Veronick, Shyann West

Many individuals are experiencing long-term symptoms from COVID-19. It is important for occupational therapists to gain understanding of these symptoms impact on occupational performance in this population. The researchers developed a questionnaire for individuals experiencing long COVID-19 and distributed it via social media. From these responses, they selected nine respondents to participate in a qualitative interview for further insights into the impact of their long-term symptoms. These interviews were transcribed and coded for themes. All long-term effects of COVID-19 discovered in this study have significant impact on daily occupations. The most common limiting symptoms found in our data were: shortness of breath, fatigue, cognition, and mental health. The occupations most impacted were: grocery shopping, meal preparation, morning routines. As knowledge of COVID-19 and its impacts evolve, it is necessary to stay informed in order to provide appropriate and client-centered care in OT treatment and the future of our profession.

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Re*SEARCH* Dialogues 2022 Online Program

Investigating various parts of the nervous system to model motion
Nafiseh Ghaffar Nia, Ahad Nasab, Erkan Kaplanoglu, Fariba Bahrami, Amin Amiri

The motion control system involves a complex network of structures that are observed at all levels of the central nervous system. Different parts of the brain, especially the cerebral cortex, the cerebellum, and basal ganglia, have an important role in the motion system. Motion commands are transmitted through the motor neurons in the spinal cord to the muscles and motion organs. At the level of the spinal cord, some control operations are performed on the motion system, such as reflexes and adjustment of motor neuron coefficient. The harmonious and complex movements that require skill are performed through the circuits that exist between the cortex, the basal ganglia, and the cerebellum. In this study, we examine the factors affecting movement and propose a rhythmic and discrete movement modeling based on the role of the cerebral cortex, the cerebellum, and basal ganglia.

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Re*SEARCH* Dialogues 2022 Online Program

Landslide Hazards in Hamilton County, TN
A.K.M. Azad Hossain, Jacob Burleson, Jonathan Mies

The geologic setting and topography of Hamilton County, TN, make the area prone to landslides. The Chattanooga-Hamilton Regional Planning Agency reported the probability of the occurrences of landslides as "low – moderate" based on historical data (http://www.chcrpa.org/index.htm). According to this report, many hillsides and steep slopes in Hamilton County present areas potentially susceptible to landslide and erosion. It was also found that past landslide events had been associated with heavy rain, removal of vegetation, or roadway construction. Areas adjacent to stream banks are also susceptible to severe erosion following heavy rains. Although the occurrences of landslides in Chattanooga-Hamilton County areas were recognized as a "moderate" hazard, the severity of the problem was not realized until early 2019 when the landslide along Signal Mountain Road destroyed the Subway Restaurant. The problem drew more attention when landslides occurred in several other places in Chattanooga during the same period.

Since August 2016, the Geological and Environmental Remote Sensing (GERS) laboratory in the Department of Biology, Geology, and Environmental Science at The University of Tennessee at Chattanooga

(UTC) has been conducting research on the occurrences of landslides in the Chattanooga-Hamilton County areas to assist local jurisdictions with development decisions and landslide hazard mitigation.

This project is focused on the development of a Web-GIS based portal to visualize the occurrences of landslides and to develop models to identify potential areas for the occurrence of landslides using geospatial technologies coupled with machine learning algorithms.

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Re*SEARCH* Dialogues 2022 Online Program

Large Eddy Simulation based Study of Injection Characteristics on the Particle Deposition within Human Airways
Neka Long

Aerosolized drug delivery through the human airways is an effective strategy for treating pulmonary diseases, such as asthma, cystic fibrosis, chronic obstructive pulmonary disease, pulmonary infection, etc. A targeted regional deposition of the drug in the diseased pulmonary regions is key to effective treatment with minimal side effects. Although recent advancements in radiological imaging techniques have enabled detailed anatomical information to guide the treatment procedure, such information still tends to be limited leading to an inefficient treatment. To this end, computational tools can provide further insight to guide and enhance the efficiency of the treatment procedure. In this ongoing study, we employ large-eddy simulation (LES) as a computational tool to investigate the airflow and particle deposition characteristics within the upper human airways. Past studies have focused on establishing an in-house LES strategy for the study of both airflow and regional and global deposition of particles. LES of one-way coupled particle-laden flow within the human airways is carried out by employing the widely popular Eulerian-Lagrangian strategy, where the airflow is simulated using Eulerian formulation and the particles are tracked using a Lagrangian approach. The present study extends the past numerical investigation to examine the effects of injection characteristics of the particles on their regional and global deposition within the human airways. The airway model considered in this study is adopted from the well-established SimInhale benchmark case where we consider a truncated portion focusing on extrathoracic and part of intrathoracic airways. First, the airflow features within the airways will be discussed in terms of the instantaneous and time-averaged behavior of the flow field. Afterward, the results from polydisperse injection of particles for the regional and global deposition will be compared with the results from a monodisperse injection of particles. For the polydisperse injection, two different injection approaches relying on uniform and normal distributions will be analyzed.

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Re*SEARCH* Dialogues 2022 Online Program

Learning Robotics Concepts with Lego Spike Essential: Data Collection 2021 with Pre-service Teachers
Deborah McAllister, Jared Glidden

This program focused on work with Lego Spike Essential robotics, which is a kit for student use in grades 1 to 5. Each teacher self-evaluated knowledge and skills, before and after a 6-hour workshop. Though there were five workshops, each teacher completed the evaluation for only the first workshop attended. Xia and Zhong (2018) reviewed 22 papers on teaching and learning robotics content knowledge in K-12. Among the findings was that the questionnaire was one of the commonly-used assessment tools. Kim et al. (2015) studied pre-service teachers' STEM engagement, learning, and teaching via robotics. They found improvement in STEM engagement, as measured through emotional, behavioral, and cognitive factors. Tsai et al. (2019) developed a computer programming efficacy scale which can be applied to robotics education. The five subscales included Logical Thinking, Algorithm, Debug, Control, and Cooperation. During the fall semester of 2021, 20 teacher

participants provided survey data for the efficacy scale (Tsai et al., 2019) and a Lego (2016) creativity self-report. The goal was to provide high-quality, teacher professional development to increase knowledge and instructional skills for integrating robotics into the elementary grades (1-5) classroom.

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Re*SEARCH* Dialogues 2022 Online Program

Lessons Learned as a Research Graduate Assistant
Meg Miller

Graduate assistantships are important and exciting opportunities for students to learn new skills and increase their involvement in important work or research. They take hard work and the ability to learn new skills as the job demands; in my time as a graduate assistant, I have helped to conduct research on the mental wellness of college students, learned to troubleshoot survey creation, worked through IRB compliance, and integrated research into pre-published papers. This presentation is an explanation of the skills I've learned as I have conducted research, from Qualtrics surveys to tips on finding useful sources, in order to help other students as they start out on research journeys of their own.

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Re*SEARCH* Dialogues 2022 Online Program

Links between life-history, mate preferences, and the evolutionary loss of parental care
Taya de Blonk

Parental care is a fundamental life history trait that occurs in a broad range of species. Parental care behavior has been both lost and gained throughout evolutionary history, and a large body of work has focused on understanding the diversity and origin of parental care. Here, we use a mathematical approach to explore the basic life history conditions (i.e. stage-specific rates of maturation and survival) and mate preferences that could give rise to the evolutionary loss of care. Our results suggest that the evolutionary loss of parental care can be influenced by stage-specific rates of maturation and survival. Additionally, mate preference for parental care behaviors and other sexually selected traits can influence the life-history conditions under which we would expect care to be either positively or negatively selected for throughout evolutionary time. We discuss our results in comparison to the existing empirical evidence of parental care.

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Re*SEARCH* Dialogues 2022 Online Program

Location and Allocation of EMS Vehicles in Dougherty County Albany GA , Systems (EMS)
Damitha Bandara

The primary objective of an emergency medical service (EMS) system is to save lives and to minimize the effect of an emergency health incident. This goal can be achieved by providing adequate and timely paramedic support to the scene. Hence the response time, the time between the receipt of a call at the dispatch center and the arrival of the first emergency response vehicle at the scene, is vital in minimizing the impact of the incident. Locating the EMS facilities optimally can help to reduce the response time. Therefore, the objective of our study is to determine the optimal locations for emergency facility locations. We formulate an integer mathematical programming model to determine the optimal locations for multiple types of emergency

facilities such as fire stations and ambulance locations. A case study based on historical data from Dougherty County, GA EMS system is performed to test the performance of the proposed model.

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Re*SEARCH* Dialogues 2022 Online Program

Machine Learning-based 30-day Hospital Readmission Prediction for Stroke Patients
Monireh Rahmati

Early identification of patients with high risk of hospital readmission can have substantial implications for hospitals and clinicians for providing improved quality of care and proper discharge planning while mitigating excessive readmissions and reducing cost. The goal of this study is to exploit machine learning algorithms to better predict hospital readmissions after stroke. For this study, Medicare data acquired from the Centers for Medicare and Medicaid Services (CMS) were used, which includes variables such as patient demographics, diagnosis codes, procedure codes, and other clinical information. The final study cohorts were 13,788 patients who were readmitted within 30-days after discharge from their initial hospitalization of stroke. Six different predictive models were developed and tested to identify the likelihood of the patients' hospital readmissions. The GNB model with SMOTE sampling showed the best classification performance in terms of Recall (Recall = 76.8). The GBC model and the AdaBoost model with ROSE sampling yielded highest AUC of 62 and 61.6, respectively. Results from this work show that the predictive models combined with data sampling have tremendous potential to identify patients with high risk of hospital readmissions within 30 days of discharge.

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Re*SEARCH* Dialogues 2022 Online Program

Malignant hyperthermia emergency preparedness in the ambulatory surgery center setting
Bethany K. Seale, Susan Thul

Malignant hyperthermia (MH) is a genetic disorder that results in a hypermetabolic state after exposure to certain triggering agents, many of which are commonly used in the anesthesia setting. Although rare, when MH presents, the anesthesia provider must quickly identify MH based on the patient's signs and symptoms and garner additional personnel to rapidly treat and stabilize the patient, as the treatment plan for MH is extensive and time-consuming. In a major medical facility, additional personnel are easily available to rapidly assist with the treatment of an MH crisis. In an outpatient setting, additional help and resources are often scarce, so it is imperative that these facilities have an in-depth MH emergency plan that accounts for such limitations. As MH is a low frequency, high impact clinical event, it is recommended that any facility that provides anesthesia with MH-triggering agents should have not only annual MH educational in-services for all perioperative staff (including didactic and kinesthetic components and cognitive aids), but also a comprehensive, personalized plan for MH treatment and transfer of care (Hirshey Dirksen et al., 2013; Larach et al., 2012). By promoting systematic and extensive MH emergency preparedness measures, an ambulatory surgery center (ASC) can avoid undue morbidity and mortality to an MH-susceptible patient (Malignant Hyperthermia Association of United States [MHAUS], 2021; Rosenberg et al., 2015).

Keywords: Malignant hyperthermia, ambulatory surgery center, outpatient facility, emergency preparedness, mock code, simulation learning, MHAUS, cognitive aids

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Re*SEARCH* Dialogues 2022 Online Program

Mapping Relative Variation in Suspended Sediment Concentration in the Tennessee River using Remote Sensing

Braxton Anzalone

Spaceborne Remote sensing technology has been used successfully to study sediment loads in the surface water bodies for many years. There are different satellite image derived indices for analyzing sediment loads in the water. However, the performance of these indices varies. Therefore, it is important to know the performance of these indices for estimating sediment concentration in the surface water bodies.

Using Landsat 8 Operational Land Imager (OLI) imagery, this study calculated three commonly used suspended sediment concentration and turbidity estimation indices for the Tennessee River and evaluated their performance. The indices calculated include Normalized Difference Suspended Sediment Index (NDSSI), Normalized Difference Turbidity Index (NDTI), and Normalized Suspended Materials Index (NSMI).

A time series of three Landsat 8 OLI satellite images acquired over the Tennessee River within Hamilton County, TN was used to calculate the indices. Near real-time in situ measurements of turbidity for all three image acquisition dates were used to accomplish the evaluation. The obtained results will be presented and discussed.

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Re*SEARCH* Dialogues 2022 Online Program

Mapping the Changes in Urban Forest of Chattanooga, TN from 1984 – 2021

William Stuart

The city of Chattanooga, Tennessee has expanded significantly over the last several decades and continues to grow larger. As this growth continues over time, forested areas are destroyed to make ways for new urban development. In order to help conserve extant forest lands within and surrounding Chattanooga, it is necessary to quantify the changes that have occurred in forest land area within the city through time. This research takes advantage of the extensive temporal archive of multispectral satellite imagery provided by the Landsat program to conduct a 37-year land cover change analysis across Chattanooga, Tennessee. A time series of seven Landsat 5 Thematic Mapper (TM) scenes and three Landsat 8 Operational land Imager (OLI) scenes acquired over Chattanooga, TN between 1984 and 2021 at an interval of about five years was obtained and analyzed for this study. This is ongoing research. The obtained preliminary results will be presented and discussed.

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Matching Microbreaks to Enhance Worker Energy
Emma Vosika, Kristen Black

Research on worker's experience of energy is relatively limited and yet has important implications on employee wellbeing and work engagement (Quinn et al., 2012; Mäkikangas et al., 2012) Energy is a subjective assessment of how much an individual feels energized (Quinn et al., 2012) and is often regarded as a resource that can be replenished (Zhang, 2018). Individuals with depleted energy commonly engage in microbreaks to subsequently replenish energy levels (Zacher et al., 2014). Energy can be thought of as "fuel tanks" with a varying degree of fullness. These "tanks" can vary based on physical, social, emotional, and mental energy levels (Britt et al., 2013). Similarly, microbreaks can vary based on social, cognitive, and relaxation activities. Using a matching hypothesis, we hypothesized that engaging in different types of microbreaks (i.e. social, cognitive, relaxation) will predict their correspondent energy levels (i.e. social, emotional, mental).

A sample of 98 Attorneys were surveyed over the course of five days. There were more women (67.4%) sampled than men (32.6%). The average age of participants was 42 years old (SD =12.45). Participants were recruited through legal professional associations. A background survey and daily surveys lasting one week (5 days) were provided to interested Attorneys. Surveys were distributed via text/email in the morning and in the evening. Measures of social, cognitive, and relaxation microbreak engagement and social, emotional, and mental energy levels were included in the daily surveys. Participants received a $40 gift card if they had responded to at least one survey per day by the end of the study.

Results indicated that energy tended to increase throughout the week but, surprisingly, the corresponding microbreaks did not significantly predict energy. Neither specific microbreaks nor microbreaks combined had significant relationships with mental, social, or emotional energy. A supplemental analysis with work engagement as a predictor of social, cognitive, and mental energy showed significant increases in energy at the end of day. These results may be nuances of the Attorney sample. This population is often highly motivated, meaning breaks may impact energy less than engagement in work itself (Kiser, 2011). Engaging and investing in meaningful work may be more predictive of energy than microbreaks. This presents an area for future research to identify which aspects of engagement replenish energy rather than deplete it.

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Re*SEARCH* Dialogues 2022 Online Program

Media & the Home: How communication technologies changed the design of the American home, 1900 - 2020
Charlene Simmons

This book-length research project looks out how the introduction and continual development of media and communication technologies have led to changes in the design and use of the American home. The story starts with the introductions of the telephone and the phonograph at the end of the 19th century and continues as the radio, television, personal computer, Internet, and other related technologies took their place in the American home. The book traces each technology as it finds its way into the home and as its place in the home evolves over time. Along the way, the book examines how the technology changed the home, both from an interior design perspective and from an architectural perspective. This poster presents major themes from the book.

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Re*SEARCH* Dialogues 2022 Online Program

Media Sexualization and Its Impact on College-Aged Women

Madelyn Moncrief, Alexandra Zelin

Social and traditional media are often studied in relation to women's perceptions of sex. However, they are often studied separately instead of together, missing the overall connection of media on attitudes. The purpose of this study was to investigate the relationship between media consumption, specifically social media and television, and college-aged women's levels of internalized sexualization. The findings of this study found a significant positive correlation between time spent consuming romanced-based reality television and romantic comedies and higher levels of internalized sexualization in college-aged women. This study also found there to be a significant positive correlation between college women's usage of Instagram and their levels of internalized sexualization. These findings suggest that there is a significant relationship between time spent on Instagram, consumption of romance-based reality television and romantic comedies, and higher levels of internalized sexualization.

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Re*SEARCH* Dialogues 2022 Online Program

Modeling of Spiral Waves Arising in Atrial Fibrillation
James Cummins

The objective of this study is to model spirals arising in atrial fibrillation. Spiral wave fronts, known to cardiologists as cardiac rotors, are responsible for heart arrhythmias. The modeling of the path of the spiral will ultimately assist in understanding why arrhythmias occur and how to treat them. This study involved first developing a linear ray model to provide basic understanding of a rotating wave front, then generalizing to spiral models. Both the Archimedean spiral and a spiral derived from the diffusion equation are used as possible candidates to resemble cardiac rotors found in the heart.

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Re*SEARCH* Dialogues 2022 Online Program

Modeling Surface Structures for the Capture of Carbon Dioxide
Paige Freyre

Burning carbon-containing fossil fuels releases carbon dioxide into the atmosphere and contributes to global warming. Using molecular modeling, our goal is to create a simulated surface structure that can preferentially trap carbon dioxide over nitrogen from combustion exhaust gases. Our model surface is created from a single-layer hexagonal carbon structure known as graphene. The simulated model surface contains a pore with four hydroxyl groups. These OH groups are positioned to enable the formation of four hydrogen bonds with a carbon dioxide molecule and thus favor its adsorption and trapping over that of a nitrogen molecule.

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Re*SEARCH* Dialogues 2022 Online Program

Modeling the Impact of Land Use and Land Cover Change on the Water Quality of the South Chickamauga Creek of Chattanooga, Tennessee
Connor Firat

The sediment concentration in the northward flowing South Chickamauga Creek in Chattanooga, TN has been visibly seen as a significant source of sediment input into the Tennessee River during heavy rainfall and storm events. To better understand the sediment transport in the Tennessee River it is essential to quantify the incoming sediment load and determine the source of the sediments. This study aims to develop a watershed model for the Lower South Chickamauga Creek using EPA's Better Assessment Science Integrating Point and Non-point Sources (BASINS) system to investigate the impact of the recent urban growth within this watershed. The developed model incorporates the land use and impervious surface data determined by the USGS National Land Cover Database (NLCD), meteorological data from the National Land Data Assimilation System (NLDAS). The specific model domain includes Hydrologic Unit Code (HUC) 10 watershed of which sub-watersheds were delineated using Digital Elevation Model (DEM) data. This is ongoing research. The obtained preliminary results will be presented and discussed.

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Re*SEARCH* Dialogues 2022 Online Program

Modulating the Properties of Iridium and Rhenium Complexes Using N-oxide Formation
Emmie Stumbo

Cyclometalated iridium complexes have long been of interest for various applications including OLEDs and fluorescence imaging due to the ease of synthesis and their unique optical properties. A growing area of research is the use of these complexes as biological imaging agents. N-oxides have been used in organic-based probes to image hypoxia in cells; our work explores this approach with transition metal complexes. Because of their long fluorescence lifetimes and tunable emission, cyclometalated iridium complexes are viable candidates for this N-oxide approach. We have synthesized a series of these complexes which contain ligands of the form C^N and N^O that contain nitrogens able to form N-oxides. Of note, two N-oxide derivatives have been synthesized using the Acipimox ligand and characterized by NMR, UV-Vis, CV, and X-ray crystallography to analyze the change in optical properties with the addition of an N-oxide. These data were compared to their non-N-oxide congeners.

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Re*SEARCH* Dialogues 2022 Online Program

Motivational Interviewing On Campus
Kevin Doyle

Everyone struggles making positive changes in their lives. Ambivalence to change is a key issue in making changes. In this brief session, the presenter will provide an overview of Motivational Interviewing, and potential applications on campus that could help students and staff make positive changes in their work and in their lives.

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Re*SEARCH* Dialogues 2022 Online Program

Multi-stage modeling of fatigue of Ti-6Al-4V fabricated by different additive manufacturing techniques
Lionardo Lado

Additive manufacturing (AM) is becoming a popular practice in Fabricating three-dimensional objects from computer models. AM offers flexibility in fabricating complex parts, which would have limitations in other well-known forms of manufacturing. In addition, utilizing AM will save time and resources when creating

working parts. Ti-6Al-4V is a metal alloy that has a high strength to weight ratio and is extremely resistant to corrosion and thus it has various applications in aerospace, medical and other fields. Am of Ti-6Al-4V alloys opens new avenues for expanding its applications. However, the main challenge with AM of this alloy – and in general AM of Metallic parts – is the fatigue resistance and durability of the AM part, which has been reported to be much lower that of the conventional materials. In this study, the multi-stage fatigue behavior of the Ti-6Al-4v fabricated using different AM methods were compared. These include Laser Engineered Net Shaping (LENS), Electron Beam Melting (EBM), and Selective Laser Melting (SLM). Each of these processes uses a different method in constructing the chosen three-dimensional object. Microstructural data was collected from the public literature on Ti-6Al-4V. This data includes characteristic of the particle, pore size and porosity. Scanned Electron Microscopy (SEM) images were used to examine the fracture surfaces of the AM specimens' defects responsible for fatigue failure. A Multi-Stage Fatigue (MSF) model was used to study the different stages of fatigue failure in AM Ti-6Al-4V. Three stages include crack incubation, microstructurally small crack growth and long crack growth. With an emphasis on the microstructurally small crack growth and long crack growth, a comparison was made after calibrating the parameters for each of the AM process. The results determine which of the fatigue resistance governing parameters for all AM Ti-6Al-4V depend on the process. Therefore, improving the efficiency of the fatigue modeling for additive manufactured Ti-6Al-4V.

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Re*SEARCH* Dialogues 2022 Online Program

My personal history
John Zibluk

Abstract:
History can seem disconnected and arcane, even in a lively Media History class. In order to engage students, the first required essay, at the suggestion of the Walker Center, became "My personal history."

In order to demonstrate mastery of the historical methods
section of the class, students were asked to use research methods to illustrate
their own experiences with the media. They were then asked to write a
1,000-word research paper with at least three outside sources to link their
personal experience with the media to historical research.

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Re*SEARCH* Dialogues 2022 Online Program

Mystical Experience, Self-Concept, and Mental Health: An Investigational Study
Christian Ishak

Self-Transcendent Experiences (STEs) are transient mental states marked by decreased self-salience and increased feelings of connectedness (Yaden et al., 2017). Research on STEs has shown they are often perceived to be extremely meaningful experiences and are associated with many positive psychological outcomes such as positive mood, altruistic social effects, increased life satisfaction, and decreased depression (Ellerman & Reed, 2001; Griffiths et al., 2008; Streib & Hood, 2016). Although the association between Self-Transcendent Experiences (STEs) and positive mental health outcomes has been established, the mechanisms of the relationship are unknown. This study proposes and tests the theory that STEs lead to more Expansive Self-Concept (ESC), which then leads to improved mental health. It is theorized ESC is associated with improved mental health because research on self-concept has found that discrepancy between actual and ideal/ought selves as well as a lack of self/other overlap are associated with anxiety and depression. Further, excessive self-focus is associated with several negative outcomes such as depression, anxiety, shame, guilt, and disgust (Baumeister & Tice, 1990; Higgins, 1987).

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Re*SEARCH* Dialogues 2022 Online Program

NIDaaS: Network Intrusion Detection as a Service in Clouds
Chen Xu

Since cloud computing is becoming popular, more and more applications are moving into the cloud. At the same time, there are growing concerns about increasing network threats from both outside and inside the cloud to cloud users.
We present a novel cloud-native NID service called Network Intrusion Detection as a Service (NIDaaS). It provides a straightforward command-line interface so that tenant administrators can easily manage NID services and monitor targets within their tenants. In addition, NIDaaS can flexibly scale out/in the NID services to inspect the traffic based on the tenant's needs. It enables effective network detection while maintaining lightweight overhead for the cloud providers. Besides, extensible NID drivers in NIDaaS decide that the cloud provider can provide various network intrusion detection systems serving their users so that the cloud users can select a familiar NIDS and upload the tailored security policies for its NID service.
We have implemented a prototype of NIDaaS through the integration of our approach into a cloud platform, namely OpenStack. We conduct the evaluation on a multi-node OpenStack testbed. Our experiment results demonstrate that the NIDaaS outperforms the existing VM-based NID service approach substantially in terms of resource usage and detection effectiveness. Compared with container-based and VM-based NID services, our system is more elastic to cope with the ever-changing volume of network traffic.

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Re*SEARCH* Dialogues 2022 Online Program

Numerical Investigation of Bluff-Body Stabilized Turbulent Premixed Flame in the Volvo Validation Rig
Robert Smith

The combustion of fuels has numerous practical applications in the areas of energy conversion and most notably, propulsion technology. The aim of this study is to investigate and compare the instantaneous and statistical flow features behind a bluff-body premixed flame holder with the intent of understanding the impacts that both computational grid resolution and finite-rate chemical mechanisms have on the turbulent combustion model in question. The flow configuration considered in the present study corresponds to the well-established Volvo Validation Rig, where a bluff body is used to stabilize a premixed flame. Specifically, we consider premixed propane mixture at the inlet boundary of the rig for which experimental results are available for non-reacting and reacting conditions. The Volvo rig consists of a rectilinear channel with a rectangular cross-section and is divided into the following three sections: inlet, combustor, and exhaust. The bluff-body flame holder is located in the combustor section and the exhaust section is tubular. We consider only the combustor section in the present study. The present study uses large eddy simulation (LES), which is a popular strategy used in computational fluid dynamics (CFD) for the prediction and analysis of chemically reacting turbulent flows. Here it is performed using an in-house version of the OpenFOAM software, where a finite-rate chemistry approach is used by employing a globally reduced three-step and six species chemical mechanism. The flow is simulated at an inlet Reynolds number of 47000 based on the bulk velocity. The computational domain is spatially discretized using a structured mesh. To assess the effects of the grid resolution, two different computational meshes comprising of approximately 10.6 and 3.5 million finite-volume cells have been considered. Three chemical mechanisms, namely, 1-step, 2-step, and 4-step will also be considered in this study.

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Numinous Luminosity Experiences: A Scale Development and Mixed-Methods Construct Exploration
Jonathan Dinsmore

A common but underexamined theme in many mystical and nonordinary experiences is that of a numinous or extraordinary light. References to this light appear throughout mystical and religious literature, as well as in modern accounts of transcendental experiences. In psychological research, it is most well-known as an element of near-death experiences, but this light is also known to occur in unitive mystical experiences and deep states of meditation, and other non-ordinary states. While numinous luminosity experience (NLE) has been emphasized in many forms of mysticism and religion and discussed in the theoretical literature, its empirical study has been extremely limited. The threefold purpose of this mixed-methods study is to 1. develop and validate NLE as a psychological construct 2. construct and validate a scale to measure it, 3. to test for correlations between NLE and outcomes it is commonly associated with in the literature, and 3. acquire rich phenomenological data on the various types of NLE, to further develop the theoretical construct and inform future research.

https://symposium.foragerone.com/utc-research-dialogues-2022/presentations/42284

Re*SEARCH* Dialogues 2022 Online Program

Numinous Luminosity: A Scale Validation and Mixed Methods Construct Exploration
Jonathan Dinsmore

A common but underexamined theme in many mystical and nonordinary experiences is that of a numinous or extraordinary light. References to this light appear throughout mystical and religious literature, as well as in modern accounts of transcendent experiences. In psychological research, it is most well-known as an element of near-death experiences, but this light is also known to occur in unitive mystical experiences and deep states of meditation, as well. While numinous luminosity experience (NLE) has been emphasized in many forms of mysticism and religion, its empirical study has been scant and scattered. The threefold purpose of this mixed-methods study is to: 1. develop and validate NLE as a psychological construct, as well as a scale to measure it, 2. to look for correlations between NLE and outcomes it is commonly associated with in the literature, and 3. acquire rich phenomenological data on the various types of NLE, to further inform future research.

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Re*SEARCH* Dialogues 2022 Online Program

Nurse Practitioner Referral to Physical Therapy
Rachel Watts, Haley Baker, Courtney Plunkett

The majority of nurse practitioners (NP) receive their degree and practice in primary care. NPs diagnose and treat a variety of medical conditions, but may choose to refer patients to specialty health care services. Physical therapy is an example of a specialty practice NPs may refer patients to. The purpose of this study is to determine factors influencing referrals of nurse practitioners to physical therapists in order to inform interprofessional practice. This study utilizes a survey to gather information from practicing NPs regarding their referral pattern to physical therapy.

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Re*SEARCH* Dialogues 2022 Online Program

Nursing turnover and moral distress: Ideas to retain nurses at the bedsideNursing Turnover and Moral Distress: Ideas to retain nurses at the bedside
Leslie Phelps

Since the onset of COVID-19, the psychological and mental health of nurses has been negatively impacted. This leads to moral distress which can result in compassion fatigue, and increased turnover. (Labrague & de los Santos, 2020). The purpose of this scholarly project is to review results of questionnaires taken by the staff of the emergency department followed by educational sessions for to the same staff, seeing if this alters intent to stay, decreases moral distress of the emergency department staff, and reduces stress with destress techniques and a destress room. The questionnaires will be given pre and post intervention to look at the differences for intent to stay and moral distress. General demographics will also be obtained to compare these results.

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Re*SEARCH* Dialogues 2022 Online Program

Optimal Design for a Minimum Mass Described by Generalized Sturm-Lioville Problem
Tanner Smith

We describe an optimal design of a structure that is described by a Sturm-Liouville problem with spectral parameter in the boundary conditions. While previous work on the subject focused on a somewhat simplified model with applications in classical mechanics, we focus on finding solutions to a more general Sturm-Liouville problem with potential applications in quantum mechanics. However, by virtue of the generality in which the problem is considered other applications are possible.

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Re*SEARCH* Dialogues 2022 Online Program

Optimal Location and Reduced Costs Model for Emergency Service Stations
Maggie Schulte

1. Emergency Services such as Fire and Medical systems have a primary focus to minimize the effects of an emergency by providing proper and efficient support to the scene. By reducing or minimizing the response time, the time between the emergency call and the arrival of the first responder to the scene, first responders can more effectively provide prompt care to the scene. Positioning emergency stations at optimal locations aids in reducing this response time. A plethora of research has been conducted in dispatching emergency services, however, these studies focus on Emergency Medical Services (EMS) or Fire Department Services individually. As the number of strictly fire department related incidents decline, a focus of firefighters training as EMTs or Paramedics has increased. Thus, the Fire-based Emergency Medical Service has recently become more popular in the USA to provide prompt care and reduce operational costs. In this study, a mixed-integer linear programming model is developed to determine the optimal location and allocation for Fire-based emergency medical services based on combining existing stations for EMS and Fire Departments. In addition, the most efficient allocation of assets among the Fire-based Emergency Medical Services for a given budget will be determined. A case study based on historical data from Dougherty County, GA EMS system is performed to test the performance of the proposed model. The solutions obtained are further analyzed to validate that the proposed model can help develop enhanced fire-based emergency medical system designs.

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Over Look / Under Foot
Katie Hargrave

In Spring 2020, shortly before the COVID-19 pandemic, my collaborator Meredith Lynn (assistant professor at Florida State University) and I traveled to the five National Parks in Utah to create a body of work exploring access to public lands and the ways in which the National Park Service controls the experience of visitors through scenic overlooks, hiking trails, visitor centers, and promotional materials. While in Utah, we created a new artwork for each park responding to the specific culture of the park, including videos, sculptural installations, photographs, and collages. This work was shown at Granary Arts in Ephraim, Utah.

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Re*SEARCH* Dialogues 2022 Online Program

Pavement Design in Smart Cities
Forest Shober, Pascale Haug

Engineers have a vast array of data sources available to evaluate the quality of products. Meanwhile, High School students need hands-on experience applying classroom content to real world situations so that they may be more *Future Ready* upon graduation. In this project, we participated in a Civil Engineering study analyzing and comparing predictions from MEERA and NARR climate data in regards to pavement construction, distress, and lifespan. This experience was used to inspire and inform the design of a *PBL*, or *Problem Based Learning* project for high school math and science students. From the development and implementation of this PBL, we hope to provide a model for other similar projects and further develop our classroom instruction techniques and activities to include authentic hands-on problem solving.

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Re*SEARCH* Dialogues 2022 Online Program

Perception of Police Interaction at a Southern University
Faith Dixon, Dominique Molina, Alexandra Zelin

2020 was an unforgettable year for everyone. The global pandemic changed our view on how we function as a society. In addition to electing a new president and his administration. Everyone also saw the impact of the murder of George Floyd, and the rise of frustration of people of color and allies. The purpose of this study was to investigate if students at the University of Tennessee at Chattanooga perceptions of interactions with campus police with an emphasis on student race. It was hypothesized that the race of students does determine what type of interaction will happen with campus police. Eighty five undergraduate students across different demographics participated in an online survey to determine how racism has impacted their undergraduate experiences while being enrolled at The University of Tennessee at Chattanooga. This study investigated the different levels of perceived protection from on campus police officers, such as felt very protected, felt protected, did not feel either protected or not protected, did not feel protected, and not feeling any form of protection. In addition, this research proposal discusses if students have witnessed or experienced racism at the University of Tennessee at Chattanooga, and what are some actions that could be made in order to ensure the safety of every student here at the university.

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Perceptions of Bereaved Partners: Does a Lack of Differences Between Same-Sex and Opposite Sex Partners Mean Progress?
John DiClementi

LGBT+ people who have experience the death of an intimate partner may find that their relationship to the deceased has been deemed illegitimate by legal authorities, medical professionals, friends, their own family, and the family of the deceased- disenfranchising them and illegitimating their grieving experience (Cave, 2000; Green & Grant, 2008; Ingham et al., 2016). The goal of the current study was to explore how perceptions of the bereaved might vary based on the sexual orientation and gender of the bereaved. Due to the lack of research on perceptions of bereaved members of the LGBT+ community, this study utilized an experimental research design to determine if there are differences in perceptions of a bereaved person presented in a vignette. A total of 570 adults recruited from Amazon Mechanical Turk and psychology courses participated in this study. Participants were randomly assigned to one of four scenarios where the sexual orientation and gender of the target was manipulated and asked to response to a series of questions to assess their perceptions of the target. A series of 2x2 Factorial ANOVAs were conducted to determine if there was an interaction between target sexual orientation and gender on participant perceptions of target warmth, competence, resilience, depression, and need for grief. Participants also rated the level of social support they would offer the target. We found no significant interactions or main effects across all dependent variables analyzed. Study limitations and implications will be discussed.

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Photo-Voice Project: Access to Healthy Food on Campus at UTC
Dawn Ford

This poster presents the findings of a photo-voice project to identify recommendations to improve the quality of food available on campus at UTC.

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Re*SEARCH* Dialogues 2022 Online Program

Photoacoustic Detection: Study of Detection of Nicotine Vapor through PA Spectroscopy
Byron Freeman

Photoacoustic spectroscopy has been shown to detect trace-gases in parts-per-billion with cheap, simple, and effective undergraduate setups. This study was aimed to develop an undergraduate-level, prototype photoacoustic (PA) system to detect trace amounts of Nicotine vapor. A Stabilized Globar lamp with a wavelength of 0.5 to 9.0 µm, was focused with a concave lens and modulated with an optical chopper to provide an incident light source. CO2 was utilized as a safe placeholder for Nicotine vapor to test and optimize variables of cell length, microphone position, focal length, chopper duty cycle, and distance of light source. Nicotine, a liquid at room temperature, was vaporized inside a chamber of the inert gas N2 and transferred incrementally to test the Nicotine detection limits of the PA setup. Relative Nicotine concentrations as low as parts-per-ten-thousand were observed to be detectable by the PA setup. While effective, further optimization of the experimental design could improve detection limits and accuracy.

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Policy Brief: The Use of Performance-Based Funding in Higher Education Institutions
Valerie Williams

State policymakers and university administrators are faced with the dilemma of allocating scarce resources to meet the needs of their public universities. Many public universities and colleges receive state appropriations according to how well they meet broader educational goals such as student enrollment, degree production, and student retention; this funding model is known as performance-based funding. Tennessee (TN) has an increased emphasis on performance-based funding in hopes that the state's supported higher education (HE) institutions will either become more efficient in their operations, increase enrollment, or achieve both. It is imperative that policymakers and university administrators understand the many forms that performance-based funding takes in the US and which practices are best for their state based on the research and demographics. This presentation provides an objective narrative literature review of the evolution of performance-based funding in higher education and the numerous unstandardized models in use nationally and their varying results. Additionally, this study uses case study methodology to explore the specific case of performance-based funding policies in TN and its move from an enrollment-based funding model to an outcomes-based funding model. The case study results will illustrate the positive and negative impacts of performance-based funding policies on TN's student outcomes and university operations. This brief concludes with a discussion of considerations for policymakers and recommendations for TN's next HE funding model.

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Re*SEARCH* Dialogues 2022 Online Program

Poverty Simulation: Educating students and providers in healthcare disciplines to reduce bias
Farron Kilburn, Megan England

Abstract Title: Poverty Simulation: Educating students and providers in healthcare disciplines to reduce bias

Background & Problem: Poverty is a determinant of health that is associated with higher rates of chronic illness and poor health outcomes (Braveman, Arkin, Orleans, Proctor, & Plough, 2017). For individuals from more privileged backgrounds, health equity can be an abstract concept. Many have a limited understanding of the practical implications poverty has on health outcomes. This disconnect can perpetuate existing health inequities, limit perspectives, and negatively affect attitudes (Elias et al., 2016).

Purpose: It is critical for healthcare providers, especially nurse practitioners, to understand and reduce negative attitudes about the impoverished and underserved to improve patient care and health outcomes. The purpose of this study is to reduce stigma surrounding poverty and to increase cultural competency of nurse practitioners and those working in human service professions.

Discussion of issue or concepts/variables of interest: A Nursing School in the Southeast implemented the Community Action Poverty Simulation (CAPS) from the Missouri Community Action Network as a tool to help graduate nursing students, undergraduate students in health and human service disciplines, and community providers understand the reality of poverty and how it impacts individuals' health care choices. As a COVID-19 adaptation to the in-person poverty simulation, researchers administered an online tool in Spring 2020 and Summer 2021 called SPENT, a virtual game developed by Urban Ministries of Durham with similar objectives as CAPS (Urban Ministries of Durham, 2012).

Project Scope - Population, Sample, & Setting: Through 2019-2020 there have been three face-to-face poverty simulations with a total 186 participants. Face-to-face CAPS took place on-campus at a mid-sized urban institution of higher education. Graduate family nurse practitioner (FNP) students participated as part of their coursework, and undergraduate and graduate students from education, nutrition, physical therapy, and public

health programs also participated. Up to 10% of participants were community members. Over Spring 2020 and Summer 2021 there were 67 Spent Game participants (with the Diamond Debrief methodology applied). Participants were FNP students and undergraduate students from multiple disciplines. Two additional face-to-face poverty simulations took place in November 2021. Data is being analyzed from the November simulations and is forthcoming. Additional SPENT game data (n=41) from Fall 2021 is being analyzed.

Methodology: The Attitude Toward Poverty Scale (ATPS) was utilized to assess three factors affecting attitudes toward poverty pre- and post-simulation for the in-person CAPS. The ATPS utilizes a Likert-scale to evaluate stigma, structural perspectives, and personal deficiencies regarding poverty (Yun & Weaver, 2010). In the online SPENT Game intervention, we applied the Diamond Debriefing tool used in health care simulations to provide a thorough prebrief and debrief framework for groups of 20 students (maximum) at a time before and directly following the SPENT Game activity (Jaye, Thomas, & Reedy, 2015). The same ATPS pre- and post-surveys were administered before and after the SPENT Game. Each simulation data set was analyzed separately and as an aggregate whole using paired t-tests and SPSS. Results were consistent across each in-person simulation. SPENT Game participant data was collected and analyzed separately to compare outcomes.

Findings and Conclusions: Paired samples t-test have shown a statistically significant change in attitudes towards people living in poverty across all three factors for the in-person CAPS poverty simulation (1) stigma (p

Implications: The CAPS has been integrated into the nurse practitioner curriculum and subsequent simulations have been scheduled to take place each semester on the University campus. Other courses from various human service departments on campus have responded to the significant results in shifts around attitudes toward poverty by also integrating the face-to-face poverty simulation into their curriculum. Preliminary virtual SPENT Game outcomes utilizing the diamond debrief framework indicate positive, significant results, though not as significant as a face-to-face intervention. Integration of a CAPS simulation and the virtual Spent Game tool using the diamond debrief framework into NP Program curriculum are two data-supported, replicable strategies for shifting student attitudes toward poverty and preparing future NPs and those in service professions to provide more culturally competent care.

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Learning Objectives:

- Explain how to facilitate an interprofessional face-to-face and virtual poverty simulations and promote them in your community.
- Describe learning benefits and outcomes for face-to-face poverty simulation participants.
- Describe learning benefits and outcomes for online virtual Spent Game using the Diamond Debrief framework.
- Identify how a poverty simulation can shift attitudes toward poverty.

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Preparing for Success through the Robert Noyce Teacher Scholarship Program: Student Survey 2022
Deborah McAllister, Jared Glidden

The Noyce program is an induction program designed to help future teachers in various STEM fields get started in their careers. Induction programs such as this one have become more popular over the past few years These induction programs can have a variety of benefits for the participants, including providing financial support, mentorship from experienced teachers, and connections that can lead to field placements (Ingersoll, 2004). Studies have also shown that participation in these programs can lead to less career turnover for the teachers involved in them (Ingersoll, 2004). Other research conducted has shown that induction programs for new teachers can help improve attitudes toward teaching and improve their own level of content knowledge (Luft, 2009). During the spring of 2022, a survey was sent out to participants in the Noyce program in order to gather information on how participants viewed the program in which they are involved. The survey was developed internally and was composed of 12 questions designed to gauge perceptions in three primary areas. These areas include the following: (a) factors that lead to their participation in the Noyce program, (b) what their experiences were with various parts of the program, and (c) how successful they felt the program was in preparing them to teach.

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Re*SEARCH* Dialogues 2022 Online Program

Prospectus for Future Research on Policy Planning for the Influx of Refugees and Gender-Based Violence Among Refugee Communities
Katherine Neal

There are over 30 million refugees and asylum seekers worldwide. While civil wars, persecution, and unrest continue to increase, so do the number of refugees. Half of these refugees are female and face gender-based violence in many different forms. Refugees flee to neighboring countries and search for a safer life in destination countries, resulting in a refugee crisis that has impacted every nation. Receiving the fifth highest number of refugees in the world and the highest number of refugees in the European Union, Germany has broadcasted the acceptance of refugees and asylum seekers. However, deep-rooted xenophobia and anti-immigrant beliefs have led right-wing extremists to voice and show their displeasure with the government's refugee policies. Between physical and verbal assaults from natives and overwhelmed refugee centers, female refugees in Germany are in danger of gender-based violence. From stalking to rape, gender-based violence is a form of persecution that follows female refugees from their home countries, on their journeys, and in their host communities. Since the Russian invasion of Ukraine on February 24, 2022, European countries including Germany have welcomed over 4 million Ukrainian refugees. With refugee centers filling up beyond capacity, countries must implement gender-based policies to protect this vulnerable community.

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Re*SEARCH* Dialogues 2022 Online Program

Qualifying changes to microbial communities during decomposition to interpret mat morphologies observed in the rock record
Elizabeth Lam, Ashley Manning-Berg

Evidence of early life on Earth, and likely early Mars, is microbial in origin. It is, therefore, important for us to understand post-mortem changes that may occur to the organism and alter its preservation state. Previous experimental studies have observed changes in morphology during decay and identified decomposition pathways for monocultures of coccoidal and filamentous microorganisms. Our study expands their methodology to monitor decomposition of microbial mat communities, which have a consortium of

microorganisms, and therefore, may follow different decomposition pathways. We compare our results to microbial mats preserved the rock record.

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Re*SEARCH* Dialogues 2022 Online Program

Reactive Agility, Pupil Diameter, and Injury Associations Among College Football Players
Kristopher Ippolito, Zane Slater, Trevor Shim

Abstract

Introduction:
To assess possible associations between preparticipation test results and occurrences of core or lower extremity injury (CLEI) or sport-related concussion (SRC) among Division-I FCS football players of the course of one season. It was hypothesized that participants with a history of an anterior cruciate ligament reconstruction (ACL-R) would increase their chances of a CLEI or SRC.
Methods:
Eightyseven Division I Male Football Athletes participated in the study. Metrics derived from Whole-Body Reactive Agility (WBRA) , Flanker Smartphone App, Pupil Light Reflex, and the Sport Fitness and Wellness Index Survey were collected both before and after the season. Injury occurrence and time lost due to injury data was obtained from an electronic injury documentation program.
Results:
Associations were present between athletes who had a history of an ACL-R and total distance covered in the WBRA 179m and their risk of obtaining a Core or Lower Body Injury (P=.009). Athletes who had a Flanker Rate Correct Ratio 0.64 and a maximum pupil diameter 5.47mm were at greater odds of being diagnosed with a SRC (OR: 8.13, CI = 1.86, 35.47).
Conclusion:
History of an ACL-R and WBRA total distance were the two best predictors of an increased risk of a CLEI or SRC in football players. If an athlete has had both an ACL-R as well as a larger total distance covered in the WBRA, they were the highest risk population.

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Re*SEARCH* Dialogues 2022 Online Program

Real-time inline monitoring of food waste anaerobic biodigestion process
Jakob Lewis

The project will develop a single-stage recirculating anaerobic digestion process for continuous breakdown of complex organic materials from food wastes with real-time monitoring of key process parameters. It will develop inline sensing systems for real-time monitoring of pH, temperature, and CO2 as important parameters relevant to the rate of biodigestion. Such inline monitoring systems will help to optimize of the biodigestion process for biogas production and bioproduct development.

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Re*SEARCH* Dialogues 2022 Online Program

Reassessing A Pivotal Moment in the Battle of Chickamauga

Austin Averill

The Battle of Chickamauga is known as one of the bloodiest battles of the Civil War, where Confederate soldiers were able to break through Union lines near modern day Brotherton Field and secure a key victory (Cozzens, 1992). Since the dedication of Chickamauga & Chattanooga National Military Park in 1890, the National Park Service (NPS) has developed various projects to maintain the park's historic context, including recent plans to restore Brotherton Field to its historic condition (Chickamauga & Chattanooga National Military Park, 2018). The ground disturbing nature of a recent project required a cultural resource survey that was conducted with the assistance of Archaeological Field Methods (ANTH 3350), including myself. Under the direction of Dr. Morgan F. Smith and ARPA permit CHCH-2020-1, 749 artifacts were collected from 486 positive test points (Figure 1). Given that historic accounts may contain flaws (Scott et. al., 2006), this assessment seeks to assess the agreement of listed accounts with recently collected data from Brotherton Field.

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Re*SEARCH* Dialogues 2022 Online Program

Recent Advances of Electrochemical Impedance Spectroscopy in Biological Lipid Bilayer Membranes
Nafiseh Ghaffar Nia, Khalid Tantawi

Lipid Bilayer Membranes (LBMs) form the cellular boundaries that biologically and chemically separate the intracellular from the extracellular environment for biological cells. They also encapsulate many cellular organelles such as the Golgi Apparatus, mitochondria, and endoplasmic reticulum. With remarkably high flexibility, they form very complex and robust conformations such as in the Golgi apparatus; consequently, the mechanical dynamics and electrical characteristics of LBMs are the subjects of active research.

Electrochemical Impedance Spectroscopy (EIS) is an efficient and widely used method for characterizing the dielectric properties of biological systems. Unlike dielectrophoresis, EIS is non-invasive and does not need labeling to measure the dielectric properties. In addition to that, it is based on an electrical impedance model, which can be much more accurately described, when compared to the fluid mosaic model, and the classical bilayer mechanics theory, and other models that attempted to describe the dynamics of LBMs.

In this work, we investigate the recent advances in electrochemical impedance spectroscopy of biological lipid bilayer membranes and compare the results of different works reported in the literature on biological phospholipid bilayer membranes. Values of electrical resistivities of phospholipid bilayer membranes that are reported in the literature vary by as much as six orders of magnitude.

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Re*SEARCH* Dialogues 2022 Online Program

Reflection Flyway: Art as Science Communication
Derek Witucki

An artistic endeavor that celebrates and share excitement on the study and conservation of migratory birds. Reflection Flyway is an interpretive installation that developed out of a shared vision to activate a space actively collecting scientific data in order to engage the broader community with the science and conservation work around them.

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Re*SEARCH* Dialogues 2022 Online Program

Relationship of Perceptual-Motor Function with Lower Extremity Injuries Among Female College Basketball Players

Sydne Stepaniuk, Zach Brown, Bailey Sexton

Background: While participation in sports, athletics, and exercise can provide significant physical and mental health benefits, musculoskeletal injury is a perpetual risk factor. Complex, recurring, or chronic injuries have the propensity to worsen over an athlete's lifespan, potentially causing progressive dysfunction and degenerative changes. It is well established that perceptual-motor function is an important component of injury avoidance as well as increased sports performance. Research has also shown that athletes exhibiting symptoms of mental health disorders like anxiety and depression have a further increase in injury risk. **Purpose:** To assess the potential predictive value of various metrics derived from tests of perceptual-motor performance and responses to surveys pertaining to persisting effects of prior musculoskeletal injuries, mental well-being, and sleep quality for identification of individual female college basketball players who possess elevated risk for core or lower extremity injury. **Methods:** Participants were 11 NCAA D-1 female basketball players. We evaluated the metrics assessed by using the Sports Fitness Index (SFI), Pittsburgh Sleep Quality Index (PSQI), and Depression, Anxiety, and Stress Scale (Dass) surveys, as well as the Flanker Test via smartphone app, Whole-Body Reactive Agility testing via the Trazer Sport Simulator, and Pupil Light Reflex (PLR) testing to find potential predictors of core or lower extremity injury. The cohort was assessed pre-participation to the 2021-2022 season 6 weeks prior to the first competition. Core and lower extremity injuries were documented electronically for a surveillance period of 122 days. **Results:** Flanker Test Rate Correct Score 1.68sec, Right eye constriction latency (PLR) 0.28sec, as well as a score of greater than 1 on item 10 of the SFI were found to correlate with an increased risk of core and/or lower extremity injury. **Conclusion:** Our results demonstrated pre-participation perceptual-motor tests as well as survey responses can be used to identify athletes with an elevated risk of injury. Cognitive, motor, autonomic control, and psycho-behavioral processes appear to be interrelated and inefficient neural function may adversely affect them. Mental well-being is an oft-overlooked consideration that may adversely affect brain processing efficiency, which could also be an important injury risk factor. Athletes who exhibit suboptimal perceptual-motor efficiency may derive benefit from training that progressively increases perceptual-motor demands.

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Re*SEARCH* Dialogues 2022 Online Program

ReLF: Scalable Remote Live Forensics for Android

Ruipeng Zhang

The world has witnessed the proliferation of mobile technologies as well as smartphone-related cybercrimes in recent years. However, due to high mobility of smartphones and tablets and transient nature of those attacks, previous forensic approaches become inadequate to retrieve forensic data and respond to cybersecurity incidents in time, especially when the investigation involves a large number of mobile devices. In this paper, we propose ReLF, a remote live forensics system for Android smartphones and tablets. ReLF enables forensic investigators to effectively triage operating Android devices and acquire a wide range of forensic artifacts at scale. Compared to existing Android forensic tools that are publicly available, ReLF provides a much more comprehensive set of collectible artifacts and better OS compatibility. Our evaluation results demonstrate that the ReLF client only introduces minor energy overhead to Android devices and that the ReLF server can well handle a large number of Android devices with increasing workload. We also showcase how ReLF can be used in real-world forensic investigation through case studies.

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Re*SEARCH* Dialogues 2022 Online Program

Religious Deconversion and Secular Disaffiliation

William Andrews

The aim of this study is to broaden the theoretical concept of deconverting from a faith or religious community into a more secularized exploration into individuals leaving communities and the interpersonal causes for this departure. This study theoretically examines self-professed causes into why individuals choose to disaffiliate from communities as well as the forms that disaffiliation manifests post-departure. Religious deconversion has a substantial body of previous research (Streib, 2020; Streib, Hood, Keller, Csöff, & Silver, 2009), as well as many more in-depth analysis of the phenomenon (Inbari, 2018; Perez & Vallières, 2019). As these studies are rooted in faith-based research, little attention has been given to the potential presence of the phenomenon of deconversion in secular institutions. This study offers a new theoretical conceptualization of an existing theory and is accompanied by critiques of existing methodological approaches. Two qualitative cases are textually analyzed in order to identify emergent themes in organizational and interpersonal deconversion, which provides non-religious structure for the psychological mechanism for deconversion or organizational disaffiliation. This analysis provides the theoretical framework needed to broaden deconversion into a secular, organizational concept and can be a proactive tool in combatting dysfunction on an organizational level.

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Re*SEARCH* Dialogues 2022 Online Program

Retaining Employees Through and Beyond Pregnancy: The Importance of Career Encouragement and Career Engagement
Sarah Iverstine, Alexandra Zelin

Career encouragement and career engagement are essential to success in the workplace. The present study investigates the extent to which these variables are present for women who are pregnant and, more specifically, if that changes based upon if the pregnancy is "visible."

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Re*SEARCH* Dialogues 2022 Online Program

Scheduling for success: Relationships between schedules, individual difference factors, and goal execution
Anna Pusser, Morgan Robinson

Need for cognition (NFC) encompasses one's desire for engagement in complex cognitive tasks (Cacioppo and Petty, 1982). Currently, there is a lack of research regarding the relationships between NFC, resilience, work schedule, and sleeping habits in college students. In the current study, the researchers consider how internal and external factors influence student ability to complete academic and self-care goals over a five-day period. This article specifically seeks to focus on the relationships between those internal and external factors with an overall focus on NFC. Emotional resilience correlates with the characteristic of conscientiousness in students, working adult populations, and those successfully coping during the COVID-19 pandemic (Sahni, Kumari, & Pachuary, 2020). Although not much research directly relates resilience to NFC in students, this underlying similarity of conscientiousness could suggest an indirect relationship. Relationships between GPA and hours worked per week are established (Light, 2001; Tessema et al., 2014); however, a relationship between need for cognition and hours worked per week has yet to be explored. Chronic sleep deprivation may also negatively impact NFC in college students as well as their cognitive functioning, such as the consolidation of memories (Chen and Chen, 2019; Putnam, Sungkhasettee, & Roeddiger, 2016). External characteristics including sleeping habits and work schedule as well as internal characteristics including resilience and NFC were measured through self-report. The findings from the present study will speak to the relationship between these individual difference variables and goal completion in students and provide clarity regarding how these variables interact with NFC. Explicating these relationships will allow for development of interventions

targeted toward college students to improve resilience as well as management of sleeping habits and work schedule relating to NFC.

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Re*SEARCH* Dialogues 2022 Online Program

Self Esteem and Romantic Relationships
Grace Kulp, Kate Moffett, Kathryn Voges, Jeremy Whittaker, Keven Heck

The primary reason for conducting this research was to determine the correlations among variables associated with self-esteem and the quality of one's romantic relationships in college students. 131 college students participated in an online survey that measured reported levels of self-esteem and relationship satisfaction. Researchers observed themes that indicated positive self-perception to be a key determinant of relationship security, satisfaction, and quality. The opposite was also shown as the data indicated lower levels of self-esteem to correlate with higher levels of insecurity within a romantic partnership. These findings are important for professionals to consider when working with individuals who struggle with romantic attachment and self-esteem. The results can be utilized in practice to address treatment options that focus on bolstering self-esteem as a way to address relationship insecurity.

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Re*SEARCH* Dialogues 2022 Online Program

Self-perceived Attractiveness Relates to Social Anxiety in Women During a Social Task
Sam Benavides

From this study we were able to observe different psychosocial factors that influence anxiety in women based on how attractive they perceive themselves to be.
Women who perceived themselves as less attractive, had worse anxiety being evaluated by men; this could be due to negative societal notions that women are only valued on their attractiveness. However, the women who perceived themselves as highly attractive had higher anxiety levels being evaluated by another women. This could be explained by a double edge sword attractiveness hold in western culture. Attractiveness could be a good thing when being evaluated by men, but jealousy and other emotions may be present when being evaluated by other women.

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Re*SEARCH* Dialogues 2022 Online Program

Sex, shame, and substance misuse: Examining the relations among shame, drinking behaviors, and sexual orientation
Byron Russell, Savannah Woods

Previous psychological and medical literature has shown that those in the lesbian, gay, and bisexual (LGB) community suffer from substance misuse at rates that are considerably higher than that of their heterosexual peers. However, the scientific literature for this population is still forming, as are the theories as to why this

relationship between sexual orientation and substance misuse exists. The purpose of this research is to examine the associations between drinking problems and behaviors and (1) self-reported shame and (2) sexual orientation. Using self-report data of sexual orientation, shame, and weekly drinking behavior, a multiple regression was employed to determine the correlations among the three variables.

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Re*SEARCH* Dialogues 2022 Online Program

Sexual harassment in an overlooked occupation: Experiences of CNA's and the influence of nurses
Audrey Pennington

It is known that medical staff such as nurses are sexually harassed by the patients they are there to serve (Dean, 2020; Hibino et al., 2006), however certified nursing assistants (CNA's) are not a population that typically receives focus in research (Burgess et al., 2018; Grigorovich & Kontos, 2020; Nielsen et al., 2017). Sexual harassment in the workplace has negative effects on job satisfaction, job performance, and organizational commitment, and mental health (Sojo et al., 2016; Willness et al., 2007). CNAs may be at a higher risk for serious consequences associated with SH from patients because they have less power in an organization, tend to spend the most time directly with patients, and must frequently provide an intimate level of care for patients who need it (e.g., baths, using the restroom, changing clothes) (Burgess et al., 2018; Deery et al., 2011). The objective for this project is to determine if CNA perceptions of SH are buffered by the presence of support from supervising nurses. We hypothesize that the relationships between SH and various indicators of well-being (including burnout and job satisfaction) will be weaker when CNAs perceive more support from their direct supervisors. This, in turn, is expected to lead to lower turnover intentions.

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Re*SEARCH* Dialogues 2022 Online Program

Simplified Denoising for Robust Specific Emitter Identification of Preamble-based Waveforms
Joshua Tyler

Internet of Things (IoT) deployments continue to grow at an accelerated rate, thus presenting a growing surface over which nefarious actors can conduct attacks. This disturbing revelation is exacerbated by the fact that roughly 70% of all IoT devices employ weak or no encryption. Deep learning (DL)–based Specific Emitter Identification (SEI) has been put forward as a possible approach by which to secure IoT devices and related infrastructures. This work presents a DL-based SEI approach that remains robust under degrading signal-to-noise ratio (SNR) conditions while greatly reducing the complexity that is typically associated with DL-based approaches. The presented approach achieves an average percent classification performance of 97% or higher for SNR values greater than or equal to 6 dB.

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Re*SEARCH* Dialogues 2022 Online Program

Simulation of Shock-Boundary Layer Interaction (SBLI) using FUN3D

Emma Kate Hughes, Nina Rice

Shockwave boundary layer interactions of a blunt fin in supersonic flow is observed using Computational Fluid Dynamics (CFD). The fin is mounted in three different locations on a flat plate. These locations are found based on a relationship between the boundary layer height and the diameter of the fin's leading-edge. This viscous flow simulation uses both structured and unstructured meshes and compares the resulting pressure and velocity profiles to the structured mesh simulation and experimental results presented by Hung & Buning (1984). Using an unstructured mesh allows for more control over localized point concentration and distribution and can achieve a higher quality of resolution at the shock while using less points than a structured mesh. Different turbulence models, steady, and unsteady flow are used in FUN3D, and are compared to find what model best fits the experimental data. This simulation was able to replicate the experimental data's leading edge pressure distribution for the fin at one of the three locations with high accuracy. The results at the other two locations were not as accurate. The unsteady flow could be affecting the boundary layer more in these locations increasing the error between the simulation and experimental data. This can be further explored in future studies.

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Re*SEARCH* Dialogues 2022 Online Program

Simulations of Neutron Beta Decay and Silicon Detector Efficiency for the Nab Experiment
Ivy Cartwright

The Nab experiment, through the Spallation Neutron Source at Oak Ridge National Laboratory, will experimentally evaluate neutron beta decay and provide more information about the weak nuclear force. The Nab Experiment seeks to achieve this by measuring the electron-neutrino correlation parameter and Fierz interference term to higher precisions than previously measured. To measure these values, unpolarized neutron beta decay utilizing silicon detectors is conducted to determine the electron-neutrino correlation parameter and Fierz interference term through estimates of proton momentum and electron energy. Installation of the Nab experiment is currently in progress. Simulation studies of the systematics of the silicon detectors are also currently being conducted to aid in its installation. The silicon detectors are constructed with an aluminum wire grid in order to increase conductivity. We have produced simulation studies pertaining to the presence and parameters of the wire grid in order to evaluate the various effects on the silicon detectors and the ability to detect the electrons and protons created during the neutron beta decay. Presented are the results of the simulations performed

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Re*SEARCH* Dialogues 2022 Online Program

Singing Mocs' Arrangement of "Sweet Dreams"
Alison Allerton

Singing Mocs member Paige Bush has arranged her own a cappella choir version of "Sweet Dreams" by the duo Eurythmics. The group would like to discuss their creative process and perform their version of the song.

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Re*SEARCH* Dialogues 2022 Online Program

Situational and Individual Factors of Reactive Cognitive Control: Examining Feedback and Motivation
Robert Robbins

This study examined the influences of individuals' cognitive intrinsic motivation and the presence or absence of feedback on a cognitive task that encouraged reactive cognitive control. I hypothesized that the presence of feedback would facilitate faster responses. I also hypothesized that cognitive intrinsic motivation, one's disposition towards exerting cognitive effort, would be related to reactive cognitive control in reward situations. Sixty-six individuals completed the Need for Cognition questionnaire (Cacioppo & Petty, 1984) to measure cognitive intrinsic motivation and were randomly assigned to either a rewarded feedback or informative feedback Stroop task. My findings support my first hypothesis indicating a role of feedback in reactive cognitive control. There was partial support for my second hypothesis, that cognitive intrinsic motivation is related to rewarded reactive control performance.

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Re*SEARCH* Dialogues 2022 Online Program

Six Sigma for Reducing Student Dropouts in High School Education
Raga Ahmed, Patricia Gould, Charlton McCollum

This study concerns identifying root causes for dropout rates in selected high schools in Hamilton County, Tennessee. The analysis framework used is Six Sigma's Define, Measure, Analyze, Improve and Control (DMAIC). Data in the form of graduation rates and enrollment numbers were first collected and analyzed using the software Minitab. Further data was collected via a survey questionnaire distributed to high school teachers. Analysis of the data showed that poor reading skills played a significant role, leading to higher dropout rates. This study and future work aim to promote that education officials seek holistic approaches to mitigate the root causes of dropout rates.

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Sleep Management in Stroke Survivors: A Survey of Current Practice in Occupational Therapy
Cara Kingrea, Cindy Poole, David Levine, Nancy Fell, Christine Hostetler, Kendall Jeter, Kloe Kukta

Stroke recovery, with its foundations in neuroplasticity, is impacted by sleep. It is important for occupational therapy practitioners to actively evaluate sleep and facilitate sleep hygiene interventions with stroke survivors to optimize outcomes. This national survey examined sleep management knowledge, attitudes, and behaviors of OTs and OTAs working in stroke rehabilitation. While 98% of respondents felt sleep assessment and intervention important, they are not being regularly implemented.

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Re*SEARCH* Dialogues 2022 Online Program

Smart Planning for Stormwater Management
Jasmine Johnson, Jordyn Johnson

This project-based lesson (PBL) is designed to provide high school students with hands-on experience with real-world connections. The project aims at smart planning of urban development that would have a minimum environmental impact (traditional gray infrastructure minimized with the green infrastructure approach). In efforts, teachers with diverse teaching backgrounds in secondary education, were trained on urban designs and green infrastructure (GI) concepts over six weeks at the University of TN-Chattanooga.

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Re*SEARCH* Dialogues 2022 Online Program

Social Media's Impact on Self-Esteem within UTC Students
Abigail Brezinka, Anna Rachel Blair, Ethan White, Jenna Crabtree, Cara Lewis

The purpose of this study is to examine the repercussions of social media use on self-esteem within the college campus. The effects of social media on self-esteem aren't often examined among some minority subgroups in contrast to the majority population. This study will investigate how students demographic characteristics such as gender, race, sexual orientation, etc. and social media sites influence the relationship between social media use and self-esteem. This will contribute to understanding through an objective lens of how individuals who are developing their self-identity can experience consequences related to their self esteem.

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Re*SEARCH* Dialogues 2022 Online Program

Spatio-temporal Analysis of Snowpack in the Colorado River Watershed Using GIS
Matthew Mollica

Recent changes in Earth's climate have significantly altered how water cycles through the planet's water storage. These changes have been apparent in the desert southwest of the United States, which is provided with water by the Colorado River, and is struggling with maintaining proper water storage for human use. The Colorado River's watershed is supplied by the frozen water in the snowpack of the Rocky Mountains. Therefore, if global temperatures rise, then the area capable of storing frozen water at is expected to shrink. Therefore, in order to properly assess how much water will be available for human use, it is important to understand the seasonal hydrologic trends of these frozen reserves in reference to projected climate change. Using GIS, this study performed a change-detection analysis of the snowpack water reserves in the Colorado River Watershed over the past decade. The snowpack data derived from a snow-water equivalent model developed by NOAA was used for the time period between November 2011 and March 2022 in this study. This is ongoing research. The preliminary result will be presented and discussed.

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Stability analysis of aptamer-thrombin binding via molecular simulations
Pooja Karunanithi

This project studies the stability of the bioaffinity interaction between thrombin and its DNA aptamer molecule to support the development of new and improved thrombin-based diagnostics and targeted delivery therapy.

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Re*SEARCH* Dialogues 2022 Online Program

State-Level Comparison of Twitter Sentiment Toward Covid-19 Against 2020 U.S. Presidential Election Results
Megan Doman, Jacob Motley

Social media hosts a large set of publicly available discourse, making it an invaluable data source. SARS-CoV-2 prevention efforts saw a push to keep people at home, which led to plenty of online interaction and discussion of the pandemic. In the United States, the disease and countermeasures were highly politicized, leading to polarizing views on partisan topics surrounding Covid-19. Using terms associated with the pandemic, relevant posts from the social media platform Twitter were collected. Natural language processing was used to assign these tweets with a numerical sentiment score. We compared these sentiment scores during the period of the United States' 2020 presidential elections to see how public perception of the pandemic may have affected voting between states called in favor of the Republican or Democrat parties. The beginning of lockdowns in the United States saw as much as over twice greater correlation with Democrats, but this dropped off until sentiment almost consistently correlated slightly greater with Republican favor in the election. There does also appear to be a consistent negative correlation between Twitter sentiment and voters who were not in favor of either party.

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Re*SEARCH* Dialogues 2022 Online Program

Statistical Concerns in Google Trends-based COVID-19 Infodemiological Study
Lani Gao

Google Trends (GT) is being used as an epidemiological tool to study COVID-19 pandemic by identifying keywords in search trends that are predictive for the COVID-19 epidemiological burden. However, many of the earlier GT-based studies include potential statistical fallacies by measuring the correlation between non-stationary time sequences without adjusting for multiple comparisons, leading to concerns about the increased risk of obtaining false-positive results. In this study, we aimed to apply statistically more favorable methods to validate the earlier GT-based COVID-19 study results including COVID-19 cased and covid-19 vaccination hesitancy by state.

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STRATEGIC ORIENTATIONS AND NEW PRODUCT PERFORMANCE
Prashant Srivastava

Oral Presentation

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Re*SEARCH* Dialogues 2022 Online Program

Stress in Students with Self-reported Disabilities in an Online Learning Environment
Audrey Darnbush, William Farmer, Ariyah Robinson

Students affiliated with the UTC DRC completed an online questionnaire with the goal of determining if the shift to online learning in 2020 resulted in self-reported increased stress as measured by a perceived stress scale modified for students. Participants were also asked to categorize their disability as related to attention, learning, physical and other outcomes. A dependent sample *t*-test was used to determine if there was a

significant difference in stress ratings given for the spring semester of 2019 and the spring semester of 2020. Differences in stress outcomes between the disability groups were assessed using a One-Way ANOVA. Finally, some qualitative responses which indicate specific concerns or practices related to perceived stress are discussed.

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Student & TA Resilience Amid the COVID-19 Pandemic
Morgan Robinson, Anna Pusser

In this project we were interested in learning how the pandemic has affected undergraduate students and teaching assistants.

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Re*SEARCH* Dialogues 2022 Online Program

Student Benefits of Intergenerational Dialogue: Results from a Service-learning Experience
Zachary Swanson

Intergenerational dialogue refers to the sharing of knowledge, values, and experiences across generations. The purpose of the current study was to investigate the benefits of intergenerational dialogue in college students to better understand how meaningful intergenerational conversations can enrich the lives of students.

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Student Reflections on an Intergenerational Service-Learning Activity: Bingocize®
Amy Doolittle

This qualitative study reviewed the reflections of students who had participated in a service-learning activity utilizing Bingocize® with older adults. At the end of the experience, the students wrote reflections and those reflections are analyzed in this project to explore the themes that emerged.

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Re*SEARCH* Dialogues 2022 Online Program

Studying the Potential Impact of Groundwater Depletion on Surface Vegetation in the Mississippi Delta Using Remote Sensing
Sean Jones , A.K.M. Azad Hossain

The fertile soils of the Mississippi Delta physiographic province allow for the region to be a large producer of cotton, soy, rice, and other crops for commercial use. However, the extensive use of groundwater for irrigation raised concerns about the possible depletion of groundwater in this region. Therefore, it is important to

understand the potential impact of groundwater depletion on surface vegetation in the Mississippi Delta region. The Gravity Recovery and Climate Experiment (GRACE) satellite data provides the opportunity to monitor the changes in the groundwater surface through recording gravity fluctuations over the entire planet, with data released every month. Pairing information provided by GRACE with the Moderate Resolution Imaging Spectroradiometer (MODIS) Normalized Difference Vegetation Index (NDVI) data, it is possible to see if there is a correlation between the changes in the groundwater levels over a period from 2010 to 2020, and the overall vegetative health of the region. This paper presents the obtained preliminary results of this study.

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Re*SEARCH* Dialogues 2022 Online Program

Suffering in Silence: Addressing Second Victim Trauma and Resilience in Medical Surgical Nurses
DeOnna Anderson-Washington

The emotional health of nurses has been something that has long been forgotten. Nurses are individuals who care for others, and regularly sacrifice professionally, and personally for the health and well-being of their patients and their families. Overtime, the trauma experienced by all nurses has shown to have a profound impact on their mental and emotional health. The goal of this project is to provide nurses with the tools necessary to combat the trauma, stress, and emotions that they encounter daily in their environments, and to hopefully build stronger nurses with good emotional and mental health.

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Re*SEARCH* Dialogues 2022 Online Program

Testing relationships among self-esteem, susceptibility to embarrassment, and self-reported submissive behaviors
Savannah Woods

Social anxiety is commonly associated with low self-esteem, social alcohol consumption, and displays of socially submissive behaviors (e.g., gaze avoidance). For Research Dialogues, I will use a de-identified archival dataset (IRB-approved at Ohio University, 2012; PI: Ashley Howell) and test the associations among self-reported self-esteem, social alcohol consumption, and submissive behavior tendencies. Specifically, I plan to use multiple regression analysis to test how self-esteem and social alcohol consumption predicts self-reported submissive behaviors.

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Re*SEARCH* Dialogues 2022 Online Program

The Connection Between Sleep and Ehlers Danlos Syndrome
Nicole Curtis, Allison Center, Elizabeth Smiddy, Anthony Foster, Susan McDonald, David Levine

Researchers from the University of Tennessee at Chattanooga Occupational Therapy and Physical Therapy Departments are interested in examining the sleep patterns, sleep disturbances, and interventions used to improve sleep for individuals with Ehlers-Danlos Syndrome. Our research question was "What are the sleep characteristic, sleep disturbances, and interventions in individuals diagnosed with hypermobile type Ehlers-Danlos syndrome (hEDS)?"

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The Corporate Selfie: Evaluating the Net Promoter Score
Kevin Alton

For about 20 years, the net promoter score (NPS) has served as a popular measure of customer experience (CX) across many industries. NPS measures rely on a single question, asking the customer about their likelihood to recommend the company's goods or services to a friend or relative seeking similar goods or services. The question is based on a scale of one to 10. Respondents with the highest likelihood to recommend, indicating a nine or 10, are considered promoters. Respondents whose likelihood to recommend falls at a six or below are considered detractors. To calculate a NPS, the overall percentage of detractors is subtracted from the overall percentage of promoters, creating a range of possible scores from -100 to 100. While NPS has enjoyed many years as the gold standard of CX measures, methodological nuances raise questions about its validity and reliability as a measure. This presentation will highlight key methodological differences in NPS survey applications and their implications for corporate interpretation and self-evaluation.
Keywords
NPS, promoter, detractor, loyalty, measurement

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Re*SEARCH* Dialogues 2022 Online Program

The effect of a perceptual-motor training program on the neural processing efficiency of college football athletes
Rebecca Linderman, Elizabeth Rogers, Destiny Wilhite

PURPOSE: An assessment of the effect of perceptual-motor training on performance metrics and the relationship between multiple performance metrics and incidence of core or lower extremity injuries (CLEI). Previous studies have established an association between suboptimal visual-cognitive conflict resolution and increased risk of a core or lower extremity injury. Players who demonstrated a suboptimal performance and elevated risk for injury were used to assess performance improvement.
METHODS: The Erikson flanker task was administered via smartphone app to a cohort of 87 players during preseason. Players manually responded to the center arrow direction of 5-arrow congruent and incongruent repetitions. Performance metrics of speed-accuracy trade-off were quantified by Rate Correct Score (RCS) and Reaction Time Variability (RTV) and Flanker Conflict Effect (FCE) represented the difference in reaction time to congruent versus incongruent stimuli. RCS was used from the better of the 2 trials. Players who demonstrated CE 66 ms were selected for the perceptual-motor training and participated in both pre-and post-training flanker tasks. Training involved 2 sets of 20 lower extremity lunging motions corresponding to stimulus-response instructions for open or solid target circle movements from the center to the outer margins of the monitor. Visual-cognitive stimuli progressively increase in difficulty over the 4 weeks of the training. 55 of the original cohort completed postseason flanker task.
RESULTS: Correlations between RTV and FCE (r=0.179; pCONCLUSION: Changes in associations between FCE and RCS with RTV suggest a positive training effect that may represent improved efficiency of neural processing. Improved neural processing efficiency from training is believed to decrease injury occurrence and enhance sports performance. Retrospective analysis also suggests perceptual-motor training may stave off the negative effect of repeated head acceleration events throughout the season.https://symposium.foragerone.com/utc-research-dialogues-2022/presentations/41077

Re*SEARCH* Dialogues 2022 Online Program

The Effects of an Acute Bout of Physical Activity on Gait Speed and Dual Task Accuracy in Asymptomatic Adults
Payton Azbell, Savannah Melton, Callie Hackett, Allan Dunlay

Objectives: To investigate the effects of an acute bout of physical activity on gait speed while performing a low-level cognitive activity using a variation of the Eriksen Flanker Test.
Design: A prospective quasi-experimental cohort study
Methods: Participants consisted of 35 asymptomatic adults. Participants performed the following single tasks: 10 meters of forward walking, 6 meters of lateral walking, and a seated Eriksen Flanker cognitive task. They then performed dual tasks combining forward and lateral walking with the Flanker task. A 20-minute treadmill protocol was performed, and all previous tasks were repeated.
Results: Of the 35 participants, 18 were female (51.4%) and 17 were male (48.6%). Forward and lateral gait speed were significantly slower when performing a dual task compared to single task (p
Conclusion: Dual task activities may result in diverted attention and affect the performance of each individual task. This is more evident when performing a novel task such as lateral walking compared to usual walking. This should be considered in rehabilitation settings when assessing gait speed.

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Re*SEARCH* Dialogues 2022 Online Program

The Effects of Dissolved and Suspended Solids on Freshwater Meiofauna
Jessica Cline

Meiofauna include small-sized animals (Possible mechanisms causing biodiversity shifts could be ascribed to osmotic stresses of animals to cope with variation in dissolved solids or, more indirectly, because different sunlight penetration caused by suspended solids would affect primary production.

To test the hypothesis, water samples were collected from nine stations located along the Tennessee River in Hamilton County. Each station was visited three times, and, during each visit, environmental parameters (including dissolved and suspended solids) were measured. Meiofauna biodiversity (estimated as richness, community composition, and phylogenetic diversity) was revealed using a metagenomic approach. Statistical analyses were applied to test for possible correlations between the biodiversity estimates and the measured environmental parameters.

Results show a high biodiversity of meiofauna with more than 200 amplicon-sequence variants distributed across 10 metazoan phyla. Environmental conditions are highly variable among stations and statistical analyses show that while both dissolved solids (TDS) and turbidity (suspended solids, NTU) did not significantly affect meiofauna biodiversity in the collected samples, various other water, and sediment metrics were found to be significant predictors of meiofauna biodiversity.

In conclusion, the results of this project not only reveal for the first time the meiofauna biodiversity from the Tennessee River but also suggest that meiofauna could be used as a bioindicator for several anthropogenic activities in freshwater ecosystems.

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Re*SEARCH* Dialogues 2022 Online Program

The Effects of Polyunsaturated Fatty Acids in the Presence of Piscidins on *Vibrio cholerae*
Olivia Chester, David Giles, Myriam Cotten

Piscidins are fish antimicrobial peptides important for first line defense against microbes. These innate immune effectors adopt metalated and nonmetalated forms, although it is unknown how and when each isoform is produced. Piscidin 1 (P1) exhibits membrane disruptive properties, while piscidin 3 (P3) targets DNA, and metalation with copper (Cu^{2+}) improves their antimicrobial activity in vitro. *Vibrio cholerae* is a gram-

negative marine bacterium responsible for cholera, the acute gastrointestinal infection that threatens millions each year, especially in developing countries without access to clean water. *Vibrio cholerae* is known to utilizes exogenous polyunsaturated fatty acids (PUFAs) to remodel its membrane phospholipids. To examine the impact of PUFAs on piscidin-mediated membrane permeability and antimicrobial susceptibility, we performed dye uptake and minimum inhibitory concentration (MIC) assays with arachidonic (20:4) and docosahexaenoic (22:6) acids. In general, addition of each piscidin to PUFA-treated cells lowered membrane permeability when measured with the hydrophobic dye crystal violet. Concomitantly, the PUFA-induced changes to piscidin MIC mostly correlated with the effects on permeability. Collectively, the data highlights antimicrobial susceptibility differences based on piscidin isoform, while also demonstrating the significant effects of piscidins on membrane permeability.

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Re*SEARCH* Dialogues 2022 Online Program

The Impact of COVID on the Perception of Confidence & Competence in Graduating BSN Students
Cherry Guinn, Jenny Holcombe

Measuring the perception of confidence & competence of graduating BSN students can be valuable in examining programmatic curriculum changes and evaluating student readiness for practice. The Casey-Fink Readiness for Practice Survey (2011) is administered to undergraduate BSN students at the end of their final semester prior to graduation. Current analyses use data from a planned 5-year longitudinal study that began in Spring 2019. Specific attention is given to comparing student cohorts that graduated prior to COVID versus after the onset of COVID to determine potential changes in student perceptions of confidence & competence. Findings could inform future curricular adjustments to address specific student needs/deficits and the development or improvement of hospital-based nurse residency programs post-graduation.

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Re*SEARCH* Dialogues 2022 Online Program

The Implementation of a Second Victim Educational Module for Certified Registered Nurse Anesthetists
Rachel Nall, Susan Thul, Laura Tyndall

The second victim phenomenon refers to the concept that providers are also traumatized by unanticipated, negative patient outcomes. Limited research studies have identified the incidence of Certified Registered Nurse Anesthetist (CRNA) second victim experiences or programs to support CRNAs after a poor outcome.

The purpose of this performance improvement initiative is to identify if an educational presentation on second victim enhances a CRNA's identification of the second victim phenomenon and knowledge of resources and response best practices, when measured by pre- and post-presentation surveys over a six- month time period. This project utilized a convenience sample of TN CRNAs to measure pre- and post-test knowledge regarding second victim and best practices for peer support.

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Re*SEARCH* Dialogues 2022 Online Program

The Jones polynomial in systems with Periodic Boundary Conditions.
Kasturi Barkataki

The entanglement of collections of filaments is a problem that arises in many

contexts, such as polymers and textiles. Measuring entanglement in such systems is a challenge. In addition, many systems of filaments are modelled using Periodic Boundary Conditions (PBC). Studying entanglement in such systems is even more complex. In this paper we propose a definition for the Jones polynomial of open or closed curves in systems employing periodic boundary conditions. This is a one variable Laurent polynomial of a finite link in 3-space. For closed curves, this gives a topological invariant that captures the grain of entanglement in this infinite periodic system. In fact, we show that for systems of closed chains in 1 PBC, the periodic Jones polynomial is a repetitive factor of the Jones polynomial of the infinite component link. For open curves, this gives a polynomial with real coefficients which are continuous functions of the chain coordinates. We show with some illustrative examples that the periodic Jones polynomial is a useful tool for measuring knotting in periodic systems.

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Re*SEARCH* Dialogues 2022 Online Program

The Relationship Between COVID Experiences and Perceived Stress in Undergraduate Nursing Students
Helena Jakupovic, Clara Sawyer, Jenny Holcombe

The purpose of the current study is to examine the potential relationship between COVID experiences and perceived stress in undergraduate nursing students at UTC. Data will be collected via an anonymous Qualtrics survey link emailed to all current undergraduate nursing students in Spring 2022. Data will be analyzed via descriptive statistics and correlations using SPSS v28. Having a better understanding of the relationship between COVID experiences and perceived stress is the first step in addressing any negative ramifications in the student population.

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Re*SEARCH* Dialogues 2022 Online Program

The Relationship Between Voter Perceptions of Frequency and Police Use of Excessive Force and Support for the Death Penalty
Amelia Collins

This study will explores the relationship between voter perceptions of the frequency of police use of excessive force and support for the death penalty. Prior research illustrates that a variety of individual characteristics influence voter support for the death penalty. However, there is a gap in research examining the influence of factors beyond demographics. Therefore, this study sought to incorporate the influence of voter perceptions of other critical criminal justice topics.

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Re*SEARCH* Dialogues 2022 Online Program

The role of A-layer in polyunsaturated fatty acid (PUFA)-mediated effects on *Aeromonas salmonicida* subsp.*salmonicida*
Allen Lin

Aeromonas salmonicida subsp. *salmonicida* is a Gram-negative bacterium that infects salmonids and non-salmonids worldwide leading to an infection known as furunculosis, which is characterized by skin lesions and hemorrhages of the fish epidermis. This infection is carried out by a A+ (virulent strain) of *A. salmonicida* containing an important virulent factor known as the A-layer, which is a 2D paracrystalline structure that binds to the basement membrane and functions to promote adherence to host membranes and resistance to host

defense. The purpose of this study was to examine the ability of the A+ *A. salmonicida* to incorporate exogenous fatty acids into its lipid membrane and explore the phenotypic outcomes. *A. salmonicida* A+ and A- strains were differentiated using the Congo Red plating method. The A+ *A. salmonicida* cultures were grown in CM9 supplemented with the presence or absence of 300µM exogenous polyunsaturated fatty acids (PUFAs). Lipids were extracted and analyzed for membrane assimilation by thin-layer chromatography and ultra performance liquid chromatography mass spectrometry and showed the ability of *A. salmonicida* to incorporate exogenous fatty acids into its lipid profile. The phenotypic outcomes were examined using a series of assays for membrane permeability, antimicrobial peptide susceptibility, and biofilm formation. The fatty acid 20:5 significantly (p *A. salmonicida* being a fish pathogen.

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Re*SEARCH* Dialogues 2022 Online Program

The Second Vassiliev Measure of Uniform Random Walks in Confined Space
Philip Smith

Biopolymers, like chromatin, are often confined in small volumes. Confinement has a great effect on polymer conformations, including polymer entanglement. Polymer chains and other filamentous structures can be represented by polygonal curves in 3-space. In this manuscript, we examine the topological complexity of polygonal chains in 3-space and in confinement as a function of their length. We model polygonal chains by equilateral random walks in 3-space and by uniform random walks in confinement. For the topological characterization, we use the second Vassiliev measure. This is an integer topological invariant for polygons and a continuous functions over the real numbers, as a function of the chain coordinates for open polygonal chains. For uniform random walks in confined space, we prove that the average value of the Vassiliev measure in the space of configurations increases as $O(n^2)$ with the length of the walks or polygons. We verify this result numerically and our numerical results also show that the mean value of the second Vassiliev measure of equilateral random walks in 3-space increases as $O(n)$. These results reveal the rate at which knotting of open curves and not simply entanglement are affected by confinement.

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Re*SEARCH* Dialogues 2022 Online Program

The use of a Mobile Weather Station in measuring microclimate variation along Urban Greenways
Martina Leach

In order to understand the fine scale variability of microclimates along a greenway, we're exploring the feasibility of using a weather bike to collect microclimate data along a greenway. To see what methods are appropriate, collected data from an unshielded radiation sensor and a shieled radiation sensor will be observed for diferecnces. Micoclimate conditions that will be observed include: temperature (°F), percent relative humidity, and dew point (°F). The data will be collected by HOBO connect sensors and a Garmin GPS tracker along the greenway, while riding a bike. Using this fine scale method allows us to see when there is variation between microclimates a long the greenway.

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Re*SEARCH* Dialogues 2022 Online Program

Theoretical Studies of Benzoquinone Reactivity in Acidic and Basic Environments
Natali Majoras

Quinones are a class of organic compounds containing a six-membered unsaturated ring with two carbonyl groups. They are biologically relevant mostly due to their ability to participate in redox reactions. Prior experiments in our lab showed that quinones can induce protein modifications that are pH dependent. In an acidic environment the modifications were less significant than in a basic environment. Previous computational studies have also been carried out to model, in neutral solutions, the reaction between various quinones and various amines, used as a model for the amino group of lysine. The theoretical study presented here will extend previous work by looking at the reaction between benzoquinone and methylamine in both acidic and basic media, using few approaches. All theoretical calculations were performed using a hybrid density functional theory method, MPW1K, in conjunction with the 6-31+G(d,p) basis set.

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Re*SEARCH* Dialogues 2022 Online Program

Title: Preparing Nursing Clinical Faculty as Competent Simulation Facilitators
Rosebelle Peters

Simulation is a teaching strategy that mimics a situation or clinical setting that allows participants to experience the real event in a safe environment (Society for Simulation in Healthcare. Through simulation, participants will gain more experience in “high risk, low incidence” clinical situations compared to the traditional clinical environment. Additionally, some of the benefits from the simulation are the development of skills and knowledge through deliberate practice.

Compared with traditional clinical education, researchers posited that simulation created more engagement among students than the conventional clinical setting allowing for more meaningful work to occur. Other findings also suggested that simulation can be effectively substituted for traditional clinical experience as simulation significantly improved clinical knowledge. Emerging evidence supports the improvement of clinical performance through simulation. A study conducted by the National Council of State Boards of Nursing (NCSBN) described the benefits of simulation in the nursing curriculum. It recommended substituting clinical hours of up to 50% of clinical experiences.

Despite the critical need and increased utilization of simulation across the health care curriculum, it was noted from a review of literature that there is a lack of faculty preparation and faculty training in simulation pedagogy. For health profession students to benefit from simulation, faculty and clinical educators, need to be competent in facilitating simulation using best practice standards. Furthermore, for faculty to successfully facilitate simulation, an organized facilitator training must meet best practice standards, develop competencies, and enhance confidence levels. Therefore, the purpose of this Translational Project is to determine if a facilitator training, compared to current practice, impact clinical faculty self-reported competency in the facilitating simulation.

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Topological effects in Tau-protein aggregation
Masumi Sugiyama

Tau-proteins form aggregates that are associated with neurodegenerative diseases such as Alzheimer's disease and dementia. The mechanisms by which tau protein spatially organizes into aggregates remain largely unknown. We use Molecular Dynamics (MD) simulations to model tau proteins in solution and we apply methods from topology to rigorously characterize their structure. Recent research suggests that the presence of RNA molecules may be driving aggregation. We use MD simulations of tau proteins and RNA molecules to examine the role of RNA on tau protein conformations and test this hypothesis. Our results reveal for the first

time how protein self-entanglement and pairwise entanglement varies in the presence of RNA. Our methods can be used to provide a novel model of protein aggregation in the future.

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Re*SEARCH* Dialogues 2022 Online Program

Topological Metrics of Biopolymer Structure and Function
Eleni Panagiotou

Proteins and other biopolymers can be represented by mathematical curves in space. Understanding the structure of such macromolecules is at the core of very important problems in biology, such as protein folding, protein aggregation, and cell nucleus organization and function. The single, pairwise, or multi-chain characterization of entanglement complexity becomes rigorous in the context of mathematical topology. In this talk, we will introduce a novel and general topological approach to analyze the structures of macromolecules. We will apply our methods to proteins and show that these enable us to create a new framework for understanding protein folding, which is validated by experimental data. When applied to the SARS-CoV-2 spike protein, we see that topology can predict residues where mutations can have an important impact on protein structure and possibly in viral transmissibility. These methods can thus help us understand biopolymer function and biological material properties in many contexts with the goal of their prediction and design.

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Re*SEARCH* Dialogues 2022 Online Program

Topology of the Meiotic Spindle
Hemanth Kumar Mandya Nagaiah

The meiotic spindle undergoes significant changes during cell division, using a complex mechanism that involves changes in the conformations of microtubules. In this talk will use tools from Topology to rigorously characterize the 3-dimensional conformation of microtubules in 3 stages of meiosis using experimental data obtained through electron tomography. Our results show that the geometry/topology and entanglement of microtubules changes throughout cell division and it depends on the location of the microtubules from the centrosomes.

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Transitional Stress for UTC Freshmen
Darishia Howell, Alexis Stoker, Karlie Toler, Karah Carson, Emma Harrison, Alexis Dozier

The purpose of this study is to describe the transitional stress experienced by the freshmen at The University of Tennessee at Chattanooga. We will explore the most common stressors which include, social, financial, academic and living factors. We will use SPSS to run bivariate tests to compare the stress levels of students that are in-state and out-of-state as well as students that live on campus and off-campus. Using the data, we are going to investigate how these factors play a role in stress levels among freshmen students and use the findings to implement services on campus for those needing support with transitioning.

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TRANSPORT OF COLLOIDAL MICROPLASTICS THROUGH POROUS MEDIA
Cole White

Microplastic contamination has become an environmental and public health concern as the use of plastics increases. The risks are unresolved, in part, due to the poor understanding of the transport behavior of microplastics. Understanding the transport of microplastics through terrestrial systems is key in determining the movement and fate of microplastics. We will present results of column experiments conducted to quantify transport properties of polystyrene microbeads through quartz sand media. Influent was prepared with 10-micron fluorescent microbeads and 0.1 mM chloride and either (1) injected into the base of the column or (2) continually delivered to the base of the column for up to 10 pore volumes. Effluent fractions were analyzed using fluorescence spectroscopy and ion chromatography and modeled with Hydrus 1D. The results show that polystyrene is retarded by solid-phase sorption reactions. We hypothesize that the polystyrene spheres will be most effectively transported through well-sorted, coarse- grained media.

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Re*SEARCH* Dialogues 2022 Online Program

Upgrade of Design Standards and Redesign of Bioretention System
Beau Neidich, Carmen Harvey, Kyle Branning, Riley Ellis, Hunter Cross, Adam Belton, Jejal Bathi

Urbanization and increased precipitation due to climate change has exacerbated stormwater management problems. Such changes are resulting in an increased strain on infrastructure, public health, and property. Urban development alters natural hydrology and hydraulics, resulting in habitat modification, increased inundation, decreased biodiversity, loss of groundwater recharge, and deteriorating water quality. Bioretention systems are becoming increasingly popular to alleviate the negative impacts of stormwater. Via infiltration and redistribution of stormwater, bioretention cells intervene to mitigate flooding, combat pollution, and decrease combined sewer volumes if properly installed and maintained. However, insufficient standards and limited exploration of system specialization are affecting system functionality and performance in turn affecting the overall hydrological response. As a case study, we are investigating the performance of a 10 year old bioretention system installed in an urban setting in Chattanooga, TN. By considering design variables, soil properties, groundwater dynamics, and system monitoring, standards for bioretention systems will be developed such that strategic investments for urban stormwater management can be made.

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Urban Darter Fish in relation to point pollution in the Southeastern United States
Sentell Dickson

Abstract

Urbanization has widespread effects on mating dynamics in various species across taxonomic groups. Classically, urbanization is thought to negatively impact species' mating behavior concerning stress effects on physiology, pheromone masking and perception, and dietary changes. Such negative changes can impact the abundance of individuals within a population and can have broad effects on the persistence of a species. In the southeast, darter fish are common and diverse in local rivers and streams. Darters often use visual signals for reproduction, and given this, their mating behavior can be heavily impacted by urbanization. In the present

study, we explored the abundance of darter species in the southeast through time in relation to urbanization. We accomplished this by using GIS tools. We discuss our findings in relation to the potential effects of urbanization on darter biodiversity in general.

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Urban Heat Island Effect in the City of Chattanooga, TN
A.K.M. Azad Hossain, Shelby Campbell, Jonathan Mies

The City of Chattanooga, TN, is one of the fastest growing cities in the state. Using satellite imagery from 1986 to 2016, a recent study conducted in the Geological and Environmental Remote Sensing Laboratory (GERS-Lab) at The University of Tennessee at Chattanooga (UTC) indicates that it continues to grow. The environmental impacts due to this growth have become a major concern for the progress of sustainable development in the greater Chattanooga area. As urbanization continues in the greater Chattanooga area, it is very important to understand the possible Urban Heat Island (UHI) effect on sustainable development. Remote sensing technology has been used successfully to study UHI effects for many large cities in the United States and the rest of the world. Using a pair of thermal images acquired by NASA's Landsat 8 satellite during the summers of 2018 and 2019, another recent study conducted in the GERS-Lab at UTC found that the City of Chattanooga indeed behaves like an UHI, and its effect is significant. The present study expands upon this research to investigate the seasonal variations of UHI effects of the city. This is ongoing research, and the obtained preliminary results will be presented and discussed.

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Urbanization Effects on Apis mellifera Colonies and Beekeeper Practices
Caitlin Jarvis

Pollinators are widely recognized as critical to human food supplies and biodiversity. *Apis mellifera* is a generalist pollinator, capable of pollinating many native flowering plants, crops, and ornamental flowers. Worldwide, *A. mellifera* is the most commonly recorded insect pollinator. Over the past decades combinations of diseases, loss of floral resources, and pesticide use have led to drastic declines of many pollinators. Approximately 40% *A. mellifera* colonies are lost annually. The Southeastern United States is projected to grow rapidly in the coming decades. Studies on urbanization effects on *A. mellifera* are mixed. I visited registered bee hives in Hamilton County, Tennessee, to observe pathogen presence and severity. Participants were recruited through a survey on beekeepers and their practices, including supplemental feeding, winter preparation, and disease prevention and control measures. Of pathogens sampled for, only Varroa and *A. tumida* were present in great enough quantities for statistical analysis. Varroa levels decrease with increasing urbanization ($p=0.0127$, $n=58$), but urbanization did not have a significant effect on *A. tumida* ($p=0.1395$, $n=76$). The sugar roll method was used over alcohol wash for most hives, as many beekeepers were not willing to sacrifice bees. Productivity analysis is ongoing. Colony loss from this study is at least 38%, with data still being collected. Survey data shows that 85% of beekeepers feed, and 100% do some amount of winter preparation. 57% actively surveyed for Varroa pre-study, most agreed to varroa surveys during the study. The observation that *Varroa* levels are lower in more urbanized areas is surprising, and could be due to beekeeper practices.

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Using IBM's Quantum Experience and Qiskit to Introduce Quantum Computing in order to Enhance Student Learning
Derek Campbell

Quantum computing is a new technology that would likely revolutionize the field of computer science. Yet most students in computer science major are not exposed to basic quantum computing training. IBM provides a free, cloud access Quantum Simulations and queries to actual quantum machines. Here, we present some tutorials based on Qiskit - a free, open-source quantum computing SDK. Through these tutorials, students are able to learn, and experiment with relevant quantum resources to gain understanding of quantum computing, and prepare themselves for the future careers.

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Re*SEARCH* Dialogues 2022 Online Program

Using LMS course design and assessment for retention, progression, and graduation
Elizabeth Crawford

Abstract: Dissertations and other culminating graduate projects are often unstructured and confusing for graduate students who simply want to complete their degree. We have designed a structured dissertation course space using the university's learning management system (LMS) to keep candidates on task and on track to make progress and complete the dissertation. This structured environment, coupled with clearly established milestones and rubrics for successful completion, allows doctoral students to make steady and meaningful progress throughout the dissertation, ultimately leading to defense and graduation.

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Re*SEARCH* Dialogues 2022 Online Program

Utility-Scale versus Rooftop Solar, the Dilemma
Brandon Noel, Ricky Hardaway, Abdelrahman Karrar

Investigating the economic feasibility of injecting utility scale or rooftop scale solar throughout a power grid via comparative analysis of the levelized cost of energy of each while included the avoided cost for utility scale.

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Re*SEARCH* Dialogues 2022 Online Program

Validity of a Novel Change of Direction Test for Volleyball Players
Betsy Myers, Jon-Thomas Neely, Mary Northcutt

Purpose/Hypothesis: The primary purpose of this study was to assess the viability and validity of a change of direction (COD) test, the Five-Die test, in female collegiate volleyball players.
Subjects: 40 female recreational runners, collegiate club volleyball players, and NCAA Division I volleyball players (mean age 21.6 years, range 18-25 years).
Materials/Methods: A 4.5m x 4.5m square was delineated using non-slip markers for both the diagonal and planar components. All participants performed a 10-minute dynamic warm-up prior to testing. Participants

performed an untimed, submaximal practice trial to become familiar with both components of the test. Next, two maximal efforts were performed for both diagonal and planar components with 2-3 minutes of rest between trials. Time was recorded to the nearest .01 second using a stopwatch.
Results: Volleyball players were significantly faster than runners on both diagonal [t(38)= 2.76, p= .004] and planar [t(38)= 1.98, p= .028] components. The effect size was large (d=.87) for the diagonal component and medium (d=.63) for the planar component. No significant differences in times were found between the Division 1 and club volleyball players on either component.
Conclusion: Volleyball players were significantly faster than runners for both diagonal and planar components. Division 1 players tended to be faster than the club volleyball players.
Clinical Relevance: The combined diagonal and planar components of the Five-Die test reflect the multi-directional demands of volleyball and appears to a valid test for COD.

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Re*SEARCH* Dialogues 2022 Online Program

What is the effect of physical exertion on cognitive performance under various dual-task conditions?
Ross Sessions, Tan Le, David May

We looked at the effects of exercise on reaction time. We measured RT 4 times prior to a treadmill protocol. After the treadmill protocol was finished, the participant's were then asked to repeat the same tests just done prior. All results were recorded. Participants were all recruited from the graduate school of health professions.

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Re*SEARCH* Dialogues 2022 Online Program

What type of self-care provides the most stress relief?
Lindsey Nabors

"What type of self-care goal provides the most stress relief?"

Though research on self-care goals is limited, previous studies have been able to sort these behaviors into categories of similar tasks (Ayala & Almond, 2018). Specific categories of self-care engagement have been found to correlate to self-perceived stress reduction. These categories include physical activity (Wunsch, et al., 2017; Laugero, et al. 2011), interpersonal communication (Myers, et al., 2012), and relaxation and stress management (Roulston, et al. 2018; Myers et al. 2012) especially amongst female participants (Moses et al. 2016). However, stress has also been found to be a barrier to completing self-care tasks specifically amongst nursing and medical students (Nevins & Sherman, 2016; Kushner et al., 2011). Overall goal completion of prospective memory tasks has been found to relate to high importance ratings in relation to self-care tasks (Ihle, et al. 2012). We aim to investigate which self-care categories are the most correlated to reducing self-perceived stress, as well as if importance ratings of categories relate to stress levels. The study consisted of 116 students creating five self-care goals that they completed over a consecutive, five-day period as well as a pre- and post-test self-perceived stress scale. The participants also rated each of the goals on a scale of 1-5 as they created them. We hypothesized that the relaxation and stress management category will have the highest correlation to lowering self-perceived stress, and that importance ratings will be highest for this relaxation and stress management category as well.

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Re*SEARCH* Dialogues 2022 Online Program

When helping hurts: Understanding resource recovery in nonprofit workplaces
Laura Waldron

The present study examined the relationship between recovery experiences and strain within the nonprofit context, and identified the role that work calling, boundary permeability, and relaxation remorse had on recovery and the relationship between recovery and strain. Participants (*N* = 124 nonprofit workers and volunteers) completed a web-based survey that included questions related to their work-nonwork roles, personal recovery activities, and dimensions of strain. Regression-based analyses indicated effects of recovery on some strain outcomes and the effects of calling, boundary permeability, and relaxation remorse on recovery. Psychological detachment was most frequently related to strain in these models. Results failed to support calling, boundary permeability, or relaxation remorse as moderators of the relationship between strain and recovery, though plots from these analyses suggests trends toward support. These results expand the theoretical understanding of recovery and strain and may also assist nonprofit organizations in developing strategies and boundaries for effective employee recovery.

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Re*SEARCH* Dialogues 2022 Online Program

When the Goal is to be Less Stressed: A Naturalistic Investigation of Academic and Self-Care Goal Completion
Stephanie Wells

The demands of college are synonymous with stress for many students, with stress generally being related to academic success. The current global pandemic and associated instructional shifts have provided an additional source of stress for students. This stress can make it more challenging for students to meet academic goals and can inhibit engagement in self-care behaviors. Not all students react to stress the same way, and individual difference factors such as resilience and need for cognition may impact this stress reaction as well as academic and self-care behaviors. The ability to successfully execute academic goals is known to lead to positive academic outcomes, while unfulfilled goals may lead to increased stress. Connections have been drawn in the previous literature between self-care behaviors and academic outcomes, resilience, and stress. However, prior to the current study, self-care goal completion had yet to be studied in the same context as academic goal completion. The results of the present research revealed that students were significantly better at completing academic goals as opposed to self-care goals and that self-care goal completion predicted completion of academic goals. Further, I found a connection between self-care goal completion and stress, where greater self-care goal completion was associated with lower perceived stress following the goal completion period. These findings have implications related to student wellbeing, as this knowledge of the benefits of setting and completing self-care goals could provide justification for students to prioritize these types of tasks.

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Evaluating the Performance of PlanetScope Imagery to Study Suspended Sediment Concentrations in the South Chickamauga Creek of Chattanooga, TN
Abigail Faxon

The City of Chattanooga, TN has grown substantially during last several decades. There is increased concern about the environmental sustainability of Chattanooga's urban growth because significant impervious surface development has taken place along several streams including the South Chickamauga Creek. This caused the creek to receive increased urban runoff, which often carries sediments with different municipal pollutants.

Therefore, monitoring turbidity in the stream water is important to determine the sustainability of urban development in Chattanooga, TN.

This study compared the feasibility of different satellite sensors to remotely study qualitative suspended sediment concentrations in the lower South Chickamauga Creek by calculating Normalized Difference Suspended Sediment Index (NDSSI) using imagery acquired by Landsat 8, Sentinel – 2, and PlanetScope satellites. While both Landsat and Sentinel-2 images have been used successfully to calculate NDSSI, PlanetScope has not yet been tested. PlanetScope's very high spatial resolution makes it potentially very useful in analyzing water quality parameters in narrow creeks such as the South Chickamauga Creek. When compared a limited number of in situ total suspended sediment (TSS) measurements to the NDSSI values derived from each satellite imagery, it was found that PlanetScope imagery can be used to study qualitative suspended sediment concentration with reasonable accuracy in this study site.

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