

25th Annual
**SYMPOSIUM
OF STUDENT
SCHOLARS**

APRIL 29, 2021: VIRTUAL EDITION



KENNESAW STATE
UNIVERSITY

RECOGNIZING EXCELLENCE IN
STUDENT SCHOLARSHIP AND
CREATIVE ACTIVITY

Bagwell College of Education

Elementary & Early Childhood Education

Still a Forgotten War? Investigation of College Students' Understanding of the Korean War

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Symphony Williams

Research Mentor(s): Sohyun An

The purpose of my research is to investigate how much and what knowledge college students have on the Korean War. This study is important because the Korean War is often referred to as a “forgotten war” but is a significant event in American history, as well as an ongoing issue in today’s world. Investigation into what college students know and believe about the Korean War, as well as, where and when they learned this information, is critical in evaluating and reforming how the Korean War is taught in US schools. I designed a survey using Google Forms, and gathered results from 35 participants. In part 1 of the survey, I addressed student knowledge about the key events and dates of the war, and part 2 of the survey asked about what the students learned at different levels of their education. My analysis of survey results led to several key findings. First, roughly a third of the participants said they knew nothing about the Korean War, not even which countries were involved, the reasoning behind the conflict, or the dates it took place. Only 3 out of 35 students could give a somewhat accurate description of the Korean War, and even then, their responses were from a one-sided perspective, largely from the US perspective. The results suggest that most college students have a misunderstanding of the Korean War: the cause, execution, effect, and legacy. An implication from the study findings is that children in our schools are not being educated well enough on the Korean War. When this important and relevant subject is taught, it is without opportunity for interpretation and understanding perspectives. This evidence is vital in better educating K-12 students on the Korean War, as well as implementing a more open, impartial way of looking at historical events.

An Introduction to Haiti

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Simonica West

Research Mentor(s): Yanghee Kim

My presentation will be about Haiti and their education system. I will talk about the pros and cons of it and integrate their culture into it as well. I will also discuss an interview that I did with a friend's parents about the education system, midwifery, and policies of Haiti.

Nigerian Educational System and What Influences It Has on Young Children

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Alexandria Alexander

Research Mentor(s): Yanghee Kim

The motives for this study on Nigeria is to compare it to that of the U.S. and to explore their educational system and the impact it has on ECE Programs. While contrasting these two educational systems we will focus on the countries literacy rate, how learners are supported in their education, and is there any access to early childhood care and educational services. My information is mainly based off of literature review. However, it can be considered as a qualitative study because I also conducted an interview with A Nigerian native. In conclusion my research methods adopted are both a qualitative study method (i.e., interview and literature review).

Inclusive Education

Reaching Multilingual Learners Through Translanguaging Pedagogy

Presentation - [Join now.](#)

1:00pm – 1:15pm

Graduate Student(s): Audra Thompson

Research Mentor(s): Jayoung Choi

What are the best practices for reaching multilingual learners in K-12 classrooms? While researchers have sought for an answer to this query, several linguists have put forth the concept of translanguaging, “the deployment of a speakers’ full linguistic repertoire without regard for watchful adherence to the socially and politically defined boundaries of named (and usually national and state) languages” (Otheguy et al., 2015, p. 283). This innovative pedagogy has forged its way into many Teaching English to Speakers of Other Languages (TESOL) courses in the Inclusive Education Department at KSU, but what are the benefits of teachers using translanguaging pedagogy to encourage multilingual learners to excel academically both in their heritage language(s) (HL) and in English? This presentation will seek to answer the crucial question on translanguaging pedagogy by pulling from multiple facets of research collaboratively conducted over the past year, including but not limited to a presentation in a regional conference entitled “K-12 teachers’ ideologies of translanguaging pedagogy in an ESOL endorsement course,” interviews with several in-service teachers of multilingual students, and data collected from English to Speakers of Other Languages (ESOL) graduate and undergraduate courses (Battle et al., 2020; Choi et al., accepted for publication). The presented findings will have implications for all pre- and in-service teachers of multilingual learners in K-12 classrooms.

Secondary & Middle Grades Education

Modeling Functions: Modified Falling Ladder Task

Presentation - [Join now.](#)

9:40am – 9:55am

Graduate Student(s): Nakia Salam

Research Mentor(s): David Glassmeyer

By the time students graduate from high school, the knowledge of functions has shifted from a conceptual understanding to a procedural approach, where the understanding of functions is based upon memorized computational steps that can't be modeled. A focus on the computational aspect of functions can have a long-term effect on students' ability to understand the meaning of functional relationships, negatively affecting their overall ability to reason mathematically. Without educators making a conscious decision to recognize the value of modeling and force its' inclusion, there are few opportunities to experience the application of functional relationships in secondary mathematics classrooms. This presentation overviews a task that provides students with an opportunity to engage in the analysis of the relationship between two quantities through a modeling exploration of a variation of the infamous falling ladder problem. Students use technology to aid in their discovery as they progress through various level of the task, ranging from Geometry to Calculus topics. The overall goal is to portray a real-life situation where the problem may contain ambiguous information, too much/too little data, and involve visual representations as students model the falling ladder problem. The task included in this research provides educators with a resource that can be duplicated or expanded to provide students will a realistic modeling opportunity throughout various secondary mathematics classes.

Coles College of Business

Leven School of Management, Entrepreneurship and Hospitality

The i-mode (Almost) Went Global: A Case Study in Product Export Failure

Presentation - [Join now.](#)

12:20pm – 12:35pm

Graduate Student(s): Paola Rattu

Research Mentor(s): Canan Mutlu

The i-mode, the world's first commercial web browser technology for mobile phones was launched in Japan in 1999, encountering immediate success and rapidly dominating the Japanese market. Nevertheless, when the technology was launched in the US and in Europe in the early 2000s it was highly unsuccessful. Ultimately, the technology was abandoned outside Japan, and several manufacturers exited the mobile phone industry following their inability to understand foreign customers' needs and to innovate. This paper reconstructs the history of the i-mode technology and provides a business-oriented analysis of the causes of its debacle.

College of Architecture and Construction Management

Architecture

Sustainable Building Materials of the Future: Architectural Forms and Structural Design

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Sean Sadler and Moritz Meditz

Research Mentor(s): Giovanni Loreto

This research investigates the use of non-rigid formwork and the techniques aiming to create more efficient concrete forms. During casting, concrete takes the shape of its formwork; traditionally, these formworks are made of rigid materials like steel or wood. The results are prismatic members, which are not optimized for material usage but only for simplicity in construction. Most of the research in the area focuses on improving the constituent materials, while the formworks have remained unchanged throughout the years. By using the approach described in this study, optimized shapes are achieved. These geometries can save up to 30% of the material while maintaining the same strength. In this study, we investigated the structural capacity of reinforced concrete members built with this technique along with the necessary solutions to perform better casts. Formworks were improved with each cast until a consistent method of creating the desired beam shape was achieved. Using both software and standard laboratory tests, the data were collected and analyzed. The results show that flexible forms can create more environmentally friendly concrete structures. Our research also opened up new questions. How can the processes be more streamlined, and are there real-world applications?

How the Environment of Design Studio Education Has Changed at Kennesaw State University Due to COVID-19

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Sara Clement, Cole Curry, and Javier Molina

Research Mentor(s): Andrew Payne

Due to unprecedented circumstances, a disconnect between student engagement and performance appears to have arisen from the shift to an online format due to COVID-19. This disconnect arises from a lack of interaction within the studio environment among students and professors alike, which leads to an inability to perform as successfully as when in-person interaction is afforded. According to Ouimet and Smallwood (2005) increased student interaction has shown more student involvement, increased quality of effort, and academic integration. The aim of this research is to explore how the environment of design education has changed within Kennesaw State University due to COVID-19. The surveys, questionnaires, and interviews generated during this process will be based on the student and faculty's perspective on engagement. We aim to use qualitative data by collecting responses and comparing quality of performance pre and during COVID-19. We expect to find that lack of academic and social engagement hinders progress, as well as how limited hours of access and alternative times available to be in the design studio affects students' motivation. Interactions such as desk critiques and peer reviews, which are opportunities for students to gain feedback on their design process, are vital to the studio

experience. These findings will help guide our process of discovering what students need in a virtual format to be most successful and ways faculty can assure student success through online virtual engagement.

Rethinking the Basic Needs of the Invisible Society

Presentation – [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Jada Ross

Research Mentor(s): Ameen Farooq

Housing is a fundamental human right, yet in the land of the free and home of the world's greatest opportunities, the most vulnerable population are families with children, accounting for 33% of the homeless population. On a single night in January 2019, an estimated 171,670 people in families identify as homeless (National Alliance to End Homelessness, 2020). Families experiencing homelessness are often hidden, hindering a child's cognitive development and the guardian(s) ability to provide the necessary resources for their family's survival (Homelessness, Health, and Human Needs. Washington (DC): National Academies Press (US), 1988.). The above facts are arguably evidence of unsuccessful policy, planning, and design strategies that have failed to create more sufficient housing solutions for families experiencing homelessness. This thesis addresses homelessness as a human right issue and intends to spark an open conversation about how we can redefine our perceptions of families who experience homelessness. Additionally, the proposal aims to identify and explore the network of needs families are lacking through the design of a housing hub committed to the holistic development of homeless families experiencing disparities. Throughout research, several questions are inquired to develop mitigation strategies to combat homelessness. What are the current resources available to support these marginalized families? How is the lack of basic needs directly impacting families and their housing circumstances? How does Maslow's Hierarchy of Needs influence the mental and developmental health of homeless families? How can the establishment of a housing hub achieve a more independent and empowered environment for hidden families? Ultimately, the housing hub, integrating both dwelling and developmental components, is proposed to foster healing and self-sufficiency in the lives of homeless families.

College of Computing and Software Engineering

Computer Science

An Empirical Study of Thermal Attacks on Edge Platforms

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Tyler Holmes and Justin Duchatellier

Research Mentor(s): Kun Suo

Cloud-edge systems are vulnerable to thermal attacks as the increased energy consumption may remain undetected, while occurring alongside normal, CPU-intensive applications. The purpose of our research is to study thermal effects on modern edge systems. We also analyze how performance is affected from the increased heat and identify preventative measures. We speculate that due to the technology being a recent innovation, research on cloud-edge devices and thermal attacks is scarce. Other research focuses on server systems rather than edge platforms. In our paper, we use a Raspberry Pi 4 and a CPU-intensive application to represent thermal attacks on cloud-edge systems. We performed several experiments with the Raspberry Pi 4 and used stress-ng, a benchmarking tool available on Linux distributions, to simulate the attacks. The resulting effects displayed drastic increases in the temperature and power consumption. The key impact of our research is to highlight the following risks and mitigation plans: the vulnerability of cloud-edge systems from thermal attacks, the capability for the attacks to go unnoticed, to further the understanding of edge devices as well as the prevention of these attacks.

Do I Have Your Attention? Predicting Users' Engagement During Interviews with Biofeedback, Voice, and Supervised Machine Learning

Presentation - [Join now.](#)

2:20pm – 2:35pm

Graduate Student(s): Thaide Huichapa

Research Mentor(s): Paola Spoletini

Studies show that the quality of the information collected during an elicitation interview, and consequently the quality of the software product that needs to be developed, highly depends on the interviewee's engagement. Because of social expectations, interviewees tend to hide if they are bored or not engaged. To overcome this problem and support the analyst during the interviews, this research uses biometric data and voice features, together with supervised machine learning algorithms, to predict the interviewee's engagement. We built our solution on an experiment consisted of interviewing 31 participants. We collected the data using an Empatica wristband and a default recorder from a laptop. After preprocessing the data and segmented them into single question/answer segments, we used part of them to train different supervised machine learning algorithms and the remaining to test the algorithms in order to evaluate their effectiveness and select the one that performs better. Our results show that both biofeedback and voice, considered individually, and machine learning can be successfully used to predict participants' engagement. The results of our work, in addition to being used to help the analyst conduct better interviews by steering the interview based on the participant's engagement, can also be used to prioritize requirements.

Information Technology

Design and Implementation of a Microservices Web-based Architecture for Code Deployment and Testing

Presentation - [Join now.](#)

2:20pm – 2:35pm

Graduate Student(s): Soin Abdoul Kassif Traore

Research Mentor(s): Maria Valero, Hossain Shahriar

Many tech stars like Netflix, Amazon, PayPal, eBay, and Twitter are evolving from monolithic to a microservice architecture due to the benefits for Agile and DevOps teams. Microservices architecture can be applied to multiple industries, like IoT, using containerization. Virtual containers give an ideal environment for developing and testing of IoT technologies. Since the IoT industry has an exponential growth, it is the responsibility of universities to teach IoT with hands-on labs to minimize the gap between what the students learn and what is on-demand in the job market. That can be done by using containerization. There are many approaches in the containerization field, but they can be difficult to use without depth knowledge in virtualization and code encapsulation. After a deep analysis of the containerization challenges, we came with an idea of a microservice infrastructure based on Docker, which is an open- platform for developing, testing, and running applications using containers, to solve the virtualization and code-encapsulation problem. Our infrastructure will provide a code development and testing web-based platform that allow users to securely go in the process of containerization without spending research time in learning virtualization. So, students and researchers can focus more on the development and testing of algorithms and codes. For example, it will be easy to develop containers that allow sensors to connect to an external server in few cliques, or to run a python code in a total isolate process in minutes without downloading any containerization software.

An Investigation on Non-Invasive Brain-Computer Interfaces: Emotiv Epoc+ Neuroheadset and Its Effectiveness

Presentation - [Join now.](#)

3:20pm – 3:35pm

Graduate Student(s): Md Jobair Hossain Faruk

Research Mentor(s): Maria Valero, Hossain Shahriar

Neurotechnology describes as one of the focal points of today's research around the domain of Brain-Computer Interfaces (BCI). The primary attempts of BCI research are to decoding human speech from brain signals and controlling neuro-psychological patterns that would benefit people suffering from neurological disorders. In this study, we illustrate the progress of BCI research and present scores of unveiled contemporary approaches. First, we explore a decoding natural speech approach that is designed to decode human speech directly from the human brain onto a digital screen introduced by Facebook Reality Lab and University of California San Francisco. Then, we study a recently presented visionary project to control the human brain using Brain-Machine Interfaces (BMI) approach. We also investigate well-known electroencephalography (EEG) based Emotiv Epoc+ Neuroheadset and present experimental studies to identify six emotional parameters using brain signals by experimenting the neuroheadset among three human subjects where we utilize two classifiers, Naïve Bayes and Linear Regression to show the accuracy and competency of the Epoc+ device and its associated applications in neurotechnological research. The demonstration indicates 69% and 62% improved accuracy for the aforementioned classifiers respectively in reading the performance matrices of the participants. We envision that non-invasive, insertable, and low-cost BCI approaches shall be the focal point for not only an alternative for patients with physical paralysis but also brain understanding that would pave us to access and control the memories and brain somewhere very near.

Data Analysis Methods for Health Monitoring Sensors

Presentation - [Join now.](#)

1:00pm – 1:15pm

Graduate Student(s): Shahriar Sobhan

Research Mentor(s): Maria Valero and Hossain Shahriar

Innovations in health monitoring systems are fundamental for the continuous improvement of remote healthcare. With the current presence of SARS-CoV-2, better known as COVID-19, in people's daily lives, solutions for monitoring heart and especially respiration and pulmonary functions are more needed than ever. Besides, health monitoring systems are widely used for patients who need isolated care, unconscious patients who cannot get medical attention for themselves. As it is well-known, monitoring systems rely on sensor technologies. Currently, there are multiple research studies for remote monitoring using different types of sensors. In this effort, we survey the current approaches that utilize the advantages of sensor technologies to sense, analyze, and estimate health data relate to respiration, heart, and sleep monitoring. The focus is to illustrate the algorithms based on signal processing (SP) and machine learning (ML) techniques used on each approach to facilitate researchers' understanding of how data is processed and streamed nowadays. We have classified sensors into two main categories: contact and contactless. Among these them, we classified three types of applications such as respiratory analysis, heart analysis, and sleep pattern estimation. In each category, we discuss the different types of used sensors, the data analysis technique, and the accuracy of those techniques. We expect this effort enables researcher to find new trends and gaps for improving the current state-of-the-art of in-home healthcare monitoring and know the remaining challenges.

Framework for Collecting Data from IoT Device

Presentation - [Join now.](#)

4:00pm – 4:15pm

Graduate Student(s): Md Saiful Islam

Research Mentor(s): Maria Valero and Hossain Shahriar

The Internet of Things (IoT) is the most significant and blooming technology in the 21st century. IoT has rapidly developed by covering hundreds of applications in the civil, health, military, and agriculture areas. IoT is based on the collection of sensor data through an embedded system, and this embedded system uploads the data on the internet. Devices and sensor technologies connected over a network can monitor and measure data in real-time. The main challenge is to collect data from IoT devices, transmit them to store in the Cloud, and later retrieve them at any time for visualization and data analysis. All these phases need to be secure by following security protocol to ensure data integrity. This work presents the design of a lightweight and easy-to-use data collection framework for IoT devices. This framework consists of collecting data from sensors and sending them to Cloud storage securely and in real-time for further processing and visualization. Our main objective is to make a data-collecting platform that will be plug-and-play and secure so that any organization or research team can use it to collect data from any IoT device for further data analysis. This framework is expected to help with the data collection from a variety of different IoT devices.

Detecting and Predicting Malicious Attacks on Internet of Things Devices Using Deep Neural Networks

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Rafael Valter

Research Mentor(s): Liang Zhao

In recent years, Internet of Things devices have become increasingly prevalent because of their ability to connect to the internet for the purpose of functioning automatically, eliminating the need for human interaction. The possible applications are endless-- IoT devices are present in most, if not all commercial sectors. However, these benefits are also where the drawbacks of IoT are introduced. Before the advent of IoT, there were much less possible points of entry for an attacker, and those devices that did exist had specific standards and defenses in place to deter malicious activity. IoT poses a serious security concern because of the sheer number of devices in use and the novelty of the technology. The primary concerns IoT faces include losing user data through espionage, physical security, and hijacking devices. This paper will make use of Machine Learning and Deep Learning Methods to perform detection for the purpose of preventing attacks on IoT devices.

School of Data Science and Analytics

Reporting of Eating Disorder Deaths

Presentation - [Join now.](#)

2:40pm – 2:55pm

Graduate Student(s): Kate Mobley and Amy Hord

Research Mentor(s): Sherry Ni

Those affected by eating disorders experience disturbances in eating behaviors which are often related to underlying psychiatric disorders such as anxiety, depression, or obsessive-compulsive disorder (Parekh, 2017, Drieberg et al., 1998 p.53). The duplicitous nature of the disorder makes it difficult to diagnose, and the toll it takes on an individual's physical health makes its mortality rate the second highest among psychiatric disorders (Guinhut et al., 2021 p.130). Even if the correct education and resources are accessible to certain individuals, negative stigmatization about the disorder can make sufferers unlikely to seek help (Becker et al., 2010). Findings from analysis of death reports from the CDC WONDER database suggest that reported eating disorder deaths do not reflect the true rates of eating disorders within the population, and that minority groups are especially underreported.

Access to Higher Education: Do Schools “Grant” Success?

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Nathaniel Jones

Research Mentor(s): Susan Mathews Hardy

University education can lead to upward income mobility for low-income students. Being exposed to other student's life experiences that are different from their own may highlight activities and actions that they may want to consider aiding their success. According to the U.S. Bureau of Labor Statistics,

the median weekly earnings in 2019 for all workers in the U.S. was \$969. Of those, U.S. workers who held bachelor's degrees earned \$1,248. In 2016, the Brookings Institute found that Pell Grant recipients and first-generation student loan borrowers attended universities that had lower graduation rates and higher loan default rates in comparison to other loan borrowers. Using hypothesis tests including t-test, simple linear regression, chi-square analyses, among others, this researcher seeks to investigate relationships that may alert the reader to the needs of Pell Grant recipients and first-generation students at post-secondary institutions. For example, do Pell Grant recipients and first-generation students have lower graduation rates and higher loan default rates even at the same university? The goal is to increase graduation rates and decrease loan default rates while also enabling Pell grant recipients to leave with the least amount of debt. The College Scorecard dataset includes demographics of schools serving low-income students including Title IV participation status, the percentage of undergraduate Pell recipients, being a 2-year or 4-year institution, public or private ownership of the institution, whether the university awards Associate's, Bachelor's, or Graduate degrees, the proportion of STEM-focused majors, the net revenue per full-time student, the instructional expenditures per full-time student, the proportion of full-time faculty, and the average faculty salary. Through analyzing these variables, the reader can gain insight into the possible non-academic needs of Pell Grant recipients and first-generation students.

Is Hockey Still Canada's Game?

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Jon-Paul Faix

Research Mentor(s): Michael Frankel

The Montreal Canadiens earned the National Hockey League's 1993 Stanley Cup, which would be the last time a Canadian team won. The purpose of this research is to explore the potential relationship between the Soviet Union's 1991 collapse and the Stanley Cup's winning teams by comparing National Hockey League (NHL) players from former Soviet states on American versus Canadian teams between the 1990-91, 2007-08, and 2018-19 seasons. The chi-square results showed players from former Soviet states increased from the 1990-91 to the 2007-08 seasons for both American and Canadian teams; however, they decreased for both American and Canadian teams from the 2007-08 to the 2018-19 season. This decrease may be explained by the 2008 founding of the Kontinental Hockey League (KHL), a Eurasian hockey league mainly based in Russia. These results shifted the analysis focus to if former Soviet states players were paid larger salaries by American teams than Canadian teams, which could create a preference for playing on American teams. A two-way ANOVA comparing player nationalities, salaries, and whether they played for an American or Canadian team for the 2007-08 and 2017-18 seasons found no significant salary difference. However, 2007-08 season players from former Soviet and western European states were paid more than players from North America.

Why Does an Ex-Offender Reoffend?

Not presenting.

Undergraduate Student(s): Jacob Rybak

Research Mentor(s): Susan Mathews Hardy

What leads an offender to go back to prison? This researcher has lived in the Georgia State prison system for 3.5 years. Using personal insights as well as analytics, this researcher analyzes Iowa state's six-year data set tracking recidivism of released offenders and recommends changes to the prison system to address the analytical findings. The Iowa recidivism data set includes the following information for all offenders: age group, type of release (parole vs different discharges), release year, original offense, and whether they recidivated. For the recidivating offenders, the data set includes the days to return to prison, the type of recidivism (technicality or new crime), and the offense that caused their return. In the past, the data set has been used with machine learning algorithms to predict whether an offender will recidivate. The researcher uses logistic regression to determine which variables are best at predicting recidivism. In addition, the interrelationships between variables are investigated with parametric hypothesis tests with post hoc comparisons and graphical displays to convey the findings. Findings indicate that the original offense predicts the recidivating offense, prompting the question of whether rehabilitation is effective. Another finding indicates that different release types are related to whether an offender recidivates, and the number of days to return to prison, if they do recidivate. Considering these analyses and others, possible changes are proposed in parole, rehabilitation, and the prison environments. Reforming the prison system is complicated, but if people, especially those who are ex-offenders, join forces to find solutions, more offenders will join this researcher in being rehabilitated and reformed.

College of Science and Mathematics

Chemistry & Biochemistry

Investigating the Proton Transfer Dynamics and Vibrational Spectrum of Hydrogen Oxalate using Driven Molecular Dynamics Simulations

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Dominick Pierre-Jacques, Olivia Cochran, Dayana Salazar, and Dalton Boutwell

Research Mentor(s): Martina Kaledin

In this computational chemistry work, we describe ab initio calculations and assignment of infrared (IR) spectra of an intramolecular H-bonding system hydrogen oxalate, $C_2O_4H^-$. The mechanism and dynamics of proton transfer are of fundamental importance in chemistry and biology. In $C_2O_4H^-$, proton transfer occurs along the non-linear path. Previous experimental studies are signaling very strong coupling between OH stretch mode and low frequency motions. We calculated IR spectra at 300 K using the direct molecular dynamics (MD) method at the MP2/ aug-cc-pVDZ level of theory and assigned the prominent spectral features using the driven MD (DMD) method. The DMD method uses a sinusoidal electric field as a driving force to assist analyzing the complex anharmonic features exhibited

by hydrogen oxalate anion. The barrier height for the proton transfer is 2.93 kcal/mol at the MP2/aug-cc-pVDZ level of theory. The low energy barrier for the proton transfer and hydrogen bonding interactions complicates the IR spectrum proton stretching region for hydrogen oxalate. The O-H stretch and bending modes are expected to undergo an anharmonic shift. As a result, the proton transfer absorption bands broadened over 2800 - 3200 cm^{-1} range. Based on DMD simulations, we found that the in-plane O-H bending mode shifted to $\sim 1390 \text{ cm}^{-1}$, in excellent agreement with experimental values, while the harmonic frequency is 1441 cm^{-1} at the MP2/aug-cc-pVDZ level of theory. While the in-plane bending mode and O-H stretching mode are reported to dominate the proton transfer, our calculations indicate that the proton transfer can easily occur as a result of mode coupling. The analysis of DMD trajectories provides atomic level insights into the proton transfer motion.

Molecular Vibrations of Symmetric Molecules: Raman Scattering Driven Molecular Dynamics Method

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Dominick Pierre-Jacques, Ciara Tyler, and Jason Dyke

Research Mentor(s): Martina Kaledin

This project focuses on developing a novel computational technique to study molecular vibrations through infrared (IR) and Raman scattering Driven Molecular Dynamics (DMD) method. While the main criterion for IR absorption is a net change in the dipole moment in a molecule as it vibrates, presently we wish to predict and analyze vibrational spectra to study symmetric vibrational modes that are IR inactive or weakly active while strongly Raman active. A newly developed method was tested on CO₂, H₂O, CH₄, and C₂₀ molecules. Students optimized the molecular structures, obtained vibrational frequencies, and IR and Raman intensities. We used MP2/cc-pVDZ computational level to generate the potential energy surfaces (PES). Modified Hamilton's equations of motion include a driven term with polarizability tensor surface (PTS), the function that couples the incoming and scattered lights. The resonant motions at fundamental frequencies were analyzed and described in terms of atomic displacements and absorbed energy profiles. All MP2 computations were carried out using Gaussian 16, MOLPRO program packages, and Fortran codes developed in our laboratory. This preliminary study shows promising results and provides key probes in the chemical identification of molecules. We show that it is possible to interpret experimental infrared and Raman spectra through a combination of ab initio molecular dynamics simulations and normal mode analysis. Future prospects of this method include exploration of the role of anharmonic effects.

Exploring Green Chemistry Polymerizations for Sustainably Derived Building Blocks

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Ciara Bettis

Research Mentor(s): Graham S. Collier

Conjugated molecules and polymers have received significant attention in the area of thin-film electronics due to the ability to systematically tune optoelectronic properties and the potential for high-throughput solution processing protocols. Traditionally, thiophene-based building blocks have been

used to accomplish this however, they are derived from nonrenewable petroleum resources and have negative consequences on the environment. Furan-based monomers represent a class of building blocks derived from biorenewable feedstocks blocks but are not traditionally known to participate in green chemistry polymerizations. This presentation will describe efforts exploring the feasibility of using furan-based building blocks in C-H activated direct arylation cross-coupling reactions and polymerizations. Specifically, molecular reactions involving a diester-functionalized furan and bromobenzene will be described to provide a proof-of-concept for the cross-coupling to occur. Guided by these results, including optimized catalyst, solvent, ligands, and reaction temperature, direct (hetero)arylation polymerizations (DHAP) will be performed and fundamental structural properties will be reported. These results will lay the foundation for green chemistry protocols within the realm of sustainable monomers and accessing a new family of conjugated polymers.

Efficiency of Pharmaceutical Production

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Sammantha King

Research Mentor(s): Bharat Baruah and Ganesh Deka

Medicine is an integral part of our daily lives. Drugs are necessary to help humans, and animals maintain health as well as prevent diseases, injury and relieve us of pain. The production of pharmaceuticals requires a substantial amount of research to create new drugs safely. However, the industry can be slow to put out data and new medicines due to slow investigation into target diseases and manufacturing difficulties. The following presentation will show how advances in science and technology improve the research and development process of pharmaceutical production.

Balancing Community Health and Industry Objectives

Presentation - [Join now.](#)

9:40am – 9:55am

Graduate Student(s): Lindsay Tudor

Research Mentor(s): Bharat Baruah

The ever-changing regulatory and federal standards set by the EPA and other organizations are creating a large impact on chemical manufacturing. The Environmental Protection Agency (EPA) maintains jurisdiction under the Toxic Substances Control Act (TSCA) to enforce regulations structured to impart information regarding the health and safety of individuals, environmental impacts, and exposure thresholds of chemical substances. Flame retardants are among the chemicals assessed and restricted, most recently isopropyl phenyl phosphate. Isopropyl phenyl phosphate is a flame retardant/lubricant utilized in various industries. This presentation will examine the ramifications of stricter regulations as they apply to the flame retardant industry. The development of new, greener technology is fundamental in advancing the chemical manufacturing process. Federally imposed regulations for chemicals can be an inconvenience but are essential for the continued health and safety of humans and the environment.

Scan of the Advantage of Using Biofuels, Ethanol

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Ana Carla Bueno

Research Mentor(s): Bharat Baruah

This project focuses on developing a novel computational technique to study molecular vibrations through infrared (IR) and Raman scattering Driven Molecular Dynamics (DMD) method. While the main criterion for IR absorption is a net change in the dipole moment in a molecule as it vibrates, presently we wish to predict and analyze vibrational spectra to study symmetric vibrational modes that are IR inactive or weakly active while strongly Raman active. A newly developed method was tested on CO₂, H₂O, CH₄, and C₂O molecules. Students optimized the molecular structures, obtained vibrational frequencies, and IR and Raman intensities. We used MP2/cc-pVDZ computational level to generate the potential energy surfaces (PES). Modified Hamilton's equations of motion include a driven term with polarizability tensor surface (PTS), the function that couples the incoming and scattered lights. The resonant motions at fundamental frequencies were analyzed and described in terms of atomic displacements and absorbed energy profiles. All MP2 computations were carried out using Gaussian 16, MOLPRO program packages, and Fortran codes developed in our laboratory. This preliminary study shows promising results and provides key probes in the chemical identification of molecules. We show that it is possible to interpret experimental infrared and Raman spectra through a combination of ab initio molecular dynamics simulations and normal mode analysis. Future prospects of this method include exploration of the role of anharmonic effects.

Water Purification and the Industries It Supports

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Zeljka Zec and KJ Bell

Research Mentor(s): Bharat Baruah and Ganesh Deka

Clean and readily available water plays a crucial role in daily societal functions. The dynamic research of water purification involves the process of removing undesired chemical or biological contaminants that affect our use of fresh, consumable water. Depending on desired applications, purification quality is adjusted for use in medical settings, manufacturing, agriculture or personal use in households. Several methods and techniques have been used in the water purification process. Those processes are coagulation, flocculation, sedimentation, and filtration. Different chemicals are used in disinfection to improve the taste further and eliminate the protruding odor. Water purification could be a costly process considering the long-term maintenance of the purification plant, time-intensiveness, and possible environmental impact. Minor enhancements need to be implemented to reduce environmental issues that seem inevitable now due to quality control and lack of technological devices.

The Importance of Sulfuric Acid Production and Its Implications

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Ally Kisiel and Zoe Gurney

Research Mentor(s): Bharat Baruah and Ganesh Deka

Sulfuric acid (H₂SO₄) is an inexpensive and highly reactive acid widely used in industrial chemistry. Its applications include anything from agricultural to biological processes, from metallurgy to chemical treatments, including acid hydrolysis, the most common chemical treatment. This concentrated acid has a wide range of capabilities such as oxidation, dehydration, and sulfonation of most organic compounds giving it a broad range of applications. The versatile chemical sulfuric acid is manufactured through two distinct processes: the Lead-Chamber process and the Contact Process. Its production is significant since sulfuric acid is an essential commodity vital to the manufacture of various commercial goods used in everyday life.

Optimization of the Synthesis of 1, 3-Dimethyl-4-Nitro-1H-Benzimidazolium Iodide; Under Basic Conditions

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Cameron Wulfsohn

Graduate Student(s): Simon Young

Research Mentor(s): Daniela Tapu

1, 3-Dimethyl-4-nitro-1H-benzimidazolium iodide is an organic salt, useful as a backbone in carbene synthesis. This compound contains a nitro group, which helps distinguish it from standard 1,3-dimethyl-1H-benzimidazolium salts, allowing the synthesis of novel carbene complexes. This comes at the cost of the salt being more sensitive to the base used in its own synthesis. This sensitivity was observed through difficulty obtaining a pure high yield product. To remedy the sensitivity, the conditions of the synthesis were varied until an optimal procedure was determined. This procedure utilized potassium carbonate as the base. This was due to it being strong enough of a base to allow completion of the reaction, but still weak enough to form minimal unwanted byproducts. The procedure utilized trituration as the purification method due to its utility and simplicity, while still resulting in a very high yield. To determine the purity of the product produced using this method, the product was subjected to 1H NMR. In the 1H NMR results, the only observable impurities present were from the solvents utilized for the NMR and during purification. These results indicated an optimized method for synthesizing highly pure, high yield 1, 3-dimethyl-4-nitro-1H-benzimidazolium iodide had been determined.

Elucidating the Effects of Sustainable Solvents on Polymerizations of Conjugated Monomers

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Ally Kisiel

Research Mentor(s): Graham S. Collier

Synthesis of conjugated polymers is an extensive and potentially toxic process that traditionally requires multiple steps, toxic reagents, and nonrenewable solvents. The polymerization process of direct (hetero)arylation polymerization (DHAP) has eliminated the length and some of the toxic reactants/catalysts, but nonrenewable solvents are still used. Therefore, there is still a need to determine the viability of sustainable solvents for conjugated polymer synthesis via direct (hetero)arylation. Utilizing a newly synthesized halogenated monomer, dibromopyrrolo[3,2-b]pyrrole (Br₂DPP), that is

synthesized in a one-step process with nontoxic starting materials, this research will describe the copolymerization of DPP with thienopyrroledione (TPD). The synthesis is accomplished using an environmentally benign/sustainable polymerization process known as direct (hetero)arylation polymerization, while utilizing various sustainable solvents, such as 2-MeTHF. DHAP also will be used to produce the same polymer with both toluene, THF, and cyclopentyl methylether in order to determine the feasibility of using green solvents instead of nonrenewable solvents. Characterization of these polymers will show their molecular weights through gel-permeation chromatography (GPC), optical properties through both UV-Vis and fluorescence spectroscopies and coupling defects through proton nuclear magnetic resonance (¹H NMR) spectroscopy to validate the use of green solvents. Through this process, we will demonstrate that conjugated polymers can be synthesized using sustainable solvents, revolutionizing how conjugated polymers are synthesized and decreasing the environmental footprint left by the production of conjugated polymers.

Transmission IR of Phosphorus in Water-Ice

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Kerrigan Greene

Research Mentor(s): Heather Abbott-Lyon

The possibility of life on other planets has prompted philosophical debate and scientific research for years. As more of space is explored, and more is discovered about the origin of life, various planets and moons have come under speculation for the possibility of life. The icy moons of Saturn and Jupiter are prime examples. This is because of the presence of water-ice on their surfaces. However, there are many other important chemicals and elements necessary for life to develop and thrive. One such element is phosphorus. In order to analyze the ice on the surface of these moons and other planetary bodies, infrared spectroscopy is frequently used. This project aims to collect a series of transmission infrared spectra of phosphorus compounds in water-ice to be used as a reference. A mull cell set-up of the Omni-Cell System is being used with modifications to allow cooling to cryogenic temperatures, similar to those on icy moons. Development of a method for freezing the sample and keeping it frozen during infrared spectroscopy is underway. The solutions are made with deionized water and phosphorus compounds at super-saturated concentrations including phosphite and phosphate salts of calcium, magnesium, and iron. Metal phosphites (i.e., CaHPO₃, MgHPO₃, FeHPO₃, and Fe₂(HPO₃)₃) will be investigated first because they are significantly more soluble than the corresponding metal phosphates.

Design of CF-MOF@AgNPs Composite Materials to Detect Microplastic: SERS Detection

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Elohor Okoko

Research Mentor(s): Bharat Baruah

Plastics in micro- and nano-size have become a significant pollutant in our environment because of its non-biodegradability. The purpose of the research is to devise a way to detect nano-plastics, which are very much invisible plastics. Metal-organic framework (MOF), UiO-66-NH₂ was embedded into the cotton fabric (CF) following a solvothermal method to create a CF-MOF composite. We synthesized

silver nanoparticles (AgNPs) in water using a mixture of cetyltrimethylammonium bromide (CTAB), nonyl amine (NA), silver nitrate, and ascorbic acid. Further, the CF-MOF was dip-coated with AgNPs to fabricate CF-MOF-AgNPs composite. Nano plastics are created by breaking bulk plastics mechanically. Surface-enhanced Raman Scattering (SERS) technique is used to detect nano-plastic in the presence of CF-MOF-AgNPs. The fabricated composite material, CF-MOF-AgNPs, was characterized by FTIR, XRD, and SEM.

Elucidation of Optoelectronic Properties of Pyrrolo[3,2-b]pyrrole Chromophores

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Ryan Faddis

Research Mentor(s): Graham S. Collier

Derivatives of phenyl substituted pyrrolo[3,2-b]pyrroles have shown promise of being useful organic opto-electric compounds due to their advantageous tunability through careful synthetic design. Furthermore, one pot synthesis and readily accessible commercial reactants such as, aromatic amines and aldehydes, makes these molecules more favorable than other, more complex syntheses traditionally required for optically active organic molecules. Although relatively simple synthesize, more information from experimentation is needed to understand the optical properties of these species, and thus, a family of pyrrolo[3,2-b]pyrroles was created to provide results for our inquiries about the molecules optical characteristics. Each member of this family was provided a uniquely tuned π -system along the phenyls due to the presence of either an electron withdrawing group (nitro), electron donating group (methoxy), or electronically neutral group (methyl). When synthesized, the species showed a clear trend of yields that inversely correlated to the amount of activity found on the benzene rings substituents; this lent itself to insights into the mechanistic process of the synthesis. These molecules were then subjected to a series of experiments to elucidate their fundamental optoelectronic properties. Specifically, The UV-Vis absorbance spectroscopy provides insight into functional group influence on optical properties of neutral and oxidized species, while fluorescence and fluorescent quantum yield measurements reveal excited state relaxation pathways. Through the elucidation of these properties for this family of pyrrolo[3,2-b]pyrroles, a more apt understanding of the overall capabilities of the highly tailorable DPP scaffold can now be assessed.

The Reactivity of Metal Phosphites: Oxidative Rate Analysis

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Jamie Kitchens

Research Mentor(s): Heather Abbott-Lyon

Phosphorous compounds are involved in many of the biomolecular processes deemed fundamental for life. DNA, ATP, and phospholipids are a few of the molecules where phosphates can be found in the body. Phosphates are geochemically characterized by their low solubility and poor reactivity. This has led to the investigation of reaction mechanisms that could lead to the formation of the phosphorous compounds found in organisms. The oxidation of phosphite into phosphate could be how phosphates were introduced to life, due to phosphites being more soluble and more reactive than phosphates. We

will present the synthesis and oxidation reactivity of four metal phosphite compounds: calcium phosphite, magnesium phosphite, iron (II) phosphite, and iron (III) phosphite. Thermogravimetric analysis coupled with Fourier transform infrared spectroscopy, also known as TGIR, measures the thermal decomposition products of metal phosphite samples, and when performed with a slow ramp rate ($\sim 1^\circ\text{C}/\text{min}$) can be used to determine the activation energy of metal phosphite oxidation. This is performed to characterize the reactivity of the metal phosphites. Additionally, a tube furnace is used for the oxidative heat treatment of larger samples of metal phosphites for their analysis using different methods. FTIR and 31P NMR analysis confirm the structure and, indirectly, the oxidative state of the phosphorous compound. Characterizing the oxidative reactivity of metal phosphites will improve the parameters used in geochemical models of the early Earth and can help determine their plausibility as a source of phosphorus for prebiotic chemistry and the origin of life.

The Chemistry of Fermentation as it Relates to the Art of Winemaking

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Olivia Cochran

Research Mentor(s): Bharat Baruah

The process of fermentation can be traced back to the beginning of civilization. Countries, over time, have learned this scientific process and turned it into the backbone of their culture through the making and manufacturing of wine. While climate-change and global-warming have impacted the commercial marketability of wine, the scientific process has remained constant. This undergraduate project analyses the production, fermentation and analytical approach of producing high quality wine. Beginning from the picking of grapes, to testing the acidity through a series of titrations, winemaking is truly where science and art collide.

Energy Requirements for Abiotic Production of Phosphorous Compounds at the Ice-Schreibersite Interface

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Lindsay Hicks

Graduate Student(s): Kimberly Meyberg

Research Mentor(s): Heather Abbott-Lyon

The Abbott-Lyon Lab is investigating the chemistry at the interface of simple ices and a meteoritic mineral analogue. Phosphorous is a key component of numerous biomolecules necessary for life. Lack of an abundance of biologically accessible mineral sources of phosphates on Earth, termed “The Phosphorous Problem,” has led some origin-of-life scientists to look to extraterrestrial sources like meteoritic metal phosphides as possible sources of available phosphates. Schreibersite (Fe_2NiP) is a common mineral in iron meteorites and a plausible source of biologically accessible phosphorous. This study will measure how much energy is needed to form prebiotic phosphorous compounds at the ice-schreibersite interface. We will observe the reactions of water and methanol ices under controlled thermal radiation and electron irradiation in ultrahigh vacuum (UHV) conditions to model what an

asteroid or meteor would experience in space. A UHV apparatus equipped with an electron gun and quadrupole mass spectrometer (QMS) coupled with reflection-absorption spectroscopy (RAIRS) will be used to measure changes in the surface of the schreibersite analogue and the species desorbing from it. The purpose of our research is to determine the potential inventory of phosphorous compounds that could have been delivered to the early Earth and to collect reference spectra that will be useful in interpreting data from current and future NASA space missions such as OSIRIS-Rex.

Metal Phosphite Reactivity by Phosphonylation with Glycerol

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Ta’Nyia Heard

Research Mentor(s): Heather Abbott-Lyon

Phosphorus is an important component of many human body structures and functions, such as the hydroxyapatite that composes our bones and the nucleic acids that carry our genetic information. However, little information is known about how phosphorus was first incorporated into life during the Archaean Eon. While geological record indicated that phosphate minerals were abundant on Early Earth, these minerals are highly insoluble and, once dissolved, are highly unreactive in aqueous solutions. This research project seeks to discover and understand how organophosphates were formed through prebiotic chemistry. The Abbott-Lyon Laboratory hypothesizes that organophosphates are created through a two-step process of phosphonylation followed by oxidation. In an aqueous solution of metal phosphites, glycerol becomes phosphonylated when heated and can be oxidized subsequently, yielding the phosphorylated product. With phosphonoacetic acid as an external standard, ^{31}P NMR provides for us detect the phosphorus product and calculate their percent yields. Currently, the Abbott-Lyon Laboratory is working to optimize the parameters of the ^{31}P NMR measurements, in particular the time delay and acquisition time, to produce high-resolution, replicable spectra for percent yield analysis. We intend to compare our percent yield results with measurements for direct phosphorylation by phosphates in aqueous solutions with low water activity.

Honey Wine: Understanding How the Fermentation Process Was Improved through Modern Methods

Presentation - [Join now.](#)

4:20pm – 4:35pm

Graduate Student(s): Douglas Allyson

Research Mentor(s): Bharat Baruah

There has been a push in recent years regarding health; specifically, in nutrition. Many companies are finding ways to produce a product for an intentional consumer. Which is a bunch of complicated words to say, people are looking for more "organic/non-GMO/no sulfides added/ect..." foods. Major distributors like Whole Foods are seeing record profits from people wanting to be more selective about what they are eating. I will go over the production and fermentation of GA's largest mead maker. I will discuss how the impact of new technologies, rapid production, and intrinsic mishaps lead to advances for a small company in the alcohol business to continually better their product.

Synthesis and Characterization of a Novel Family of Bis-NHC Metal Complexes

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Cameron Wulfsohn

Graduate Student(s): Simon Young

Research Mentor(s): Daniela Tapu

Catalysts lower the energy barrier of different reactions and can provide greater selectivity with higher yields and therefore are of particular interest to material production. Improvement in catalysts can lead to greener production and a decrease in cost. N-heterocyclic carbenes (NHCs) have been recognized as a powerful class of ligands to metals, perhaps most notably in catalysis. This presentation reports a novel family of bis-NHC ligands. This family links the N-alkylated benzimidazolium moieties by a bridge providing a rigid structure for the generation of novel bis-NHCs and their corresponding metallic complexes. The unique structure of this family allows for the formation of bimetallic complexes, MCOPs, and supramolecular structures. These complexes allow for great versatility in catalytic properties, solubility, and selectivity. The synthesis and characterization of iridium complexes with these bis-NHC ligands will be presented.

Using Eye-Tracking Data to Determine What Biochemistry Students Attend to When Completing a Revised Three-Dimensional Modeling Activity

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Hailey Knoeferl and Kaylee Barbee

Research Mentor(s): Kimberly Cortes

In biochemistry, three-dimensional models are being used to help students comprehend advanced topics within the subject. Because a greater cognitive load is often related to three-dimensional models, learning what raises the cognitive load is critical. From there, measures can be taken to help lower the cognitive load and make the material easier for students to understand. To understand cognitive load in relation to models, students were presented with three-dimensional serine protease models and their substrates and asked to match the clear surface plate to the backbone, and then the substrate to the surface plate. On the substrates, students were asked to place stickers on the locations of each peptide bond and catalytic triad. Students subsequently completed a worksheet related to the task. Tobii Glasses 2 were used to track eye movement while students completed the task. Using Tobii Pro software, heat maps and Areas of Interest (AOIs) were created to indicate what areas of the three-dimensional models showed the highest points of fixation. The results discussed will include how students assessed the models, ways to improve the activity such as providing more straightforward directions, and a comparison of the AOI fixation duration of the clear surface plate activity and the color surface plate activity done the previous year.

Investigation of Chemistry at Ice-Mineral Interfaces of Phosphorus-Containing Meteorites Analogues

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Kimberly Meyberg

Research Mentor(s): Heather Abbott-Lyon

The search for life outside of Earth has raised questions about how life began have intrigued origin-of-life researchers, such as the incorporation of phosphorus into biomolecules. Phosphorus exists on Earth mostly as phosphate, PO_4^{3-} , which is insoluble and unreactive in the geochemical conditions of the early Earth. The challenge of incorporating phosphorus into biomolecules is known as the “phosphorus problem,” prompting investigations of reactive phosphorus species delivered to the prebiotic Earth. Phosphorus-laden meteorites delivered schreibersite (Fe,Ni) $_3P$, a possible mineral source of phosphorus recognized for its redox chemistry potential and observed reactivity with aqueous solutions. This thesis work aims to better understand the chemical reactions occurring on the schreibersite inclusions on comets and meteorites and will focus on 1) identifying potential prebiotic phosphorus species formed at the ice-mineral interface of schreibersite, and 2) the energy requirements necessary for the abiotic formation of phosphorus-containing compounds. Specifically, the reactions of water and methanol ices on a schreibersite analogue will be investigated upon heating and irradiation with tuneable, low-energy electrons in ultrahigh vacuum conditions, utilizing reflection-absorption infrared spectroscopy (RAIRS) to measure changes in surface structure and mass spectrometry (MS) to analyze species desorbing from the mineral surface. These experiments attempt to identify abiotic pathways in which phosphorus is incorporated into prebiotic reactions and are intended to provide reference spectra for solar system mission data. Preliminary results obtained from these experiments will be presented.

Structure and Purification of Proteins for a Structural Determination: Orf8, PaIVY1, PaIVY2

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Sarah Fashinasi and Avery Moss

Research Mentor(s): Thomas Leeper

Protein purification is a crucial procedure in order to analyze the behavior, structure, and function of a select protein. The Orf8 protein is an increasingly mutable accessory protein found within the SARS-CoV2 virus, however the complex and unpredictable nature of this protein has been met by its inability to be purified thus far. By purifying the model proteins, PaIVY1 and PaIVY2, we believe that we can denote a sound purification method to apply to the Orf8 protein. In our procedure, we transformed BL21(DE3)pLysS cells and inoculated them in LB media. The cells were then placed into a centrifuge to isolate the pellets and the substance was homogenized. We then used a microfluidizer to lyse the cells and used Immobilized Metal Affinity Chromatography (IMAC) to perform a His 1. To remove the 6-His tag from the N-terminal end of the protein, we completed a dialysis and TEV cleavage. Finally, we used IMAC a second time to complete a His 2 and Size Exclusion Chromatography (SEC) to ensure that our protein was pure. We successfully ran an SDS-PAGE gel and imaged it. The PaIVY1 and PaIVY2 samples were visible on the gel. The process that we used for purifying PaIVY1 and PaIVY2 is applicable to the Orf8 project as it entails a baseline purification method that produces a significant amount of protein for analysis.

Exploring Cellulose in Drug Compounding

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Maria Vu

Research Mentor(s): Bharat Baruah

Medicine is used to treat a plethora of diseases, but this often leads to a shortage of a commonly used drugs. In order to create more of a specific medicine when the reproduction cost is too high or missing essential materials, drug compound is necessary. However, this process is still expensive. Cellulose is the most abundant polymer due to its location in plant material. The plant goes through a mechanical size reduction and treated chemically to extract the polysaccharide polymer. When cellulose is obtained, it can be used in solid dosages, in as a thickening/suspending agent, and/or an emulsifying agent. The structure of cellulose causes the drug released to be controlled. In this presentation, the process of extracting cellulose and the use of how cellulose is manipulated is explored to better improve the efficiency of the medicine through means of low cost and drug delivery.

Protection of Intellectual Properties in the Modern Age

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Selena LaMay

Research Mentor(s): Bharat Baruah

Intellectual property can be protected through federal and state laws. Patents, copyrights, trademarks, and trade secret laws can all apply depending on the type of protection required. Due to its intangibility, though, intellectual property can require more than essential paperwork to defend. Great care must be taken to ensure documents properly follow the necessary procedures, and continuous vigilance is required to enact that legal protection. Here the methods of filing for patents and how to protect them will be highlighted.

Chemical Industrial Safety and Environmental Considerations

Presentation - [Join now.](#)

4:40pm – 4:55pm

Graduate Student(s): James Stewart

Research Mentor(s): Bharat Baruah

Workplace safety, particularly in the chemical manufacturing and treatment industries, is always at the core of any competent business strategy of any modern industrially- or manufacturing-focused company. Due to the inherent and sometimes readily apparent nature of chemical hazards, safety in these industries has been, by necessity, a practical consideration since their inception. However, only relatively recently has it developed into a significant philosophical focus of businesses, regulatory agencies such as OSHA, and associated non-regulatory bodies such as the U.S. Chemical Safety Board (CSB). Organizations like OSHA and the CSB guide policies to help shape the culture of safety in

businesses and in academia where chemical hazards are a concern. In particular, the CSB investigates and provides objective examinations of industrial accidents which involve loss of life or substantial, unintentional hazardous chemical release. They can then offer suggestions as to how these incidents could have been prevented and how policy can be developed to minimize the chances of future incidents from either occurring at all or causing injuries and fatalities if they do. Here, select incidents investigated by the CSB in the year 2019 and the determinations resulting from that investigation are examined to obtain insights into modern industrial safety policies and culture as well as promote awareness of these incidents.

Fine Tuning the Electronic Properties of Non-Conjugated Mono-Azo-Chromophores Incorporated Azaborine

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Albert Campbell, Peter Gobran, Samuel Moore, Lyric Gordon, and Temitope Folorunsho

Graduate Student(s): Robert Hughley

Research Mentor(s): Carl Jacky Saint-Louis

Azobenzene (azo) and azaborine are fascinating compounds because of their valuable and interesting optical properties making them suitable to be utilized in many optoelectronic devices. We have designed, synthesized and will investigate a series of novel non-conjugated thermally stable mono-azo-azaborine chromophores by linking the two chromophores (azo and azaborine) together as easily tunable high-luminescent organic materials. The substituent effects on the combined chromophores will be investigated by the addition of electron –withdrawing and –donating moieties to the core of the azobenzene. We will investigate the role of the electron –donating and –withdrawing substituents on the HOMO and LUMO energies to aid in understanding the fluorescence tunability. We will also investigate the effect of the photoinduced isomerization of the azobenzene on the aggregation and fluorescence of the mono-azo-azaborine chromophore.

Fine Tuning the Electronic Properties of Conjugated Mono-Azo-Chromophores Incorporated Azaborine

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Samuel Moore, Lyric Gordan, Temitope Folorunsho, Albert Campbell, and Peter Gobran

Graduate Student(s): Robert Hughley

Research Mentor(s): Carl Jacky Saint-Louis

Flat-structured heteroaromatic polycyclic compounds with extended conjugated π -systems such as azaborines are in demand in the material and imaging technology markets because of their unique features such as simultaneous tunability of fluorescence color and intensity. Azobenzene (azo) compounds and its derivatives are well-known for their stability, photo-switchability and photo-

isomerization. The unique ability of azo compounds to undergo structural transformation such from trans to cis and vice versa by irradiation at distinct wavelengths make them suitable candidates for optoelectronics, data storage and biomedical applications. We have designed, synthesized and will investigate a series of novel conjugated thermally stable mono-azo-azaborine chromophores by linking the two chromophores (azo and azaborine) together as easily tunable high-luminescent organic materials. We will investigate the impact of the azobenzene incorporation on the azaborine unit. We will investigate the effect of the addition of electron –donating and –withdrawing substituents on the core of azobenzene and its effect on the HOMO and LUMO energies to help in understanding their fluorescence tunability.

The Uses of the Aluminum Extraction By-Product Red Mud (Bauxite Residue)

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Max Thompson

Graduate Student(s): Armando Rodriguez-Campo

Research Mentor(s): Bharat Baruah and Ganesh Deka

The negative externalities of the metal production industry are one of the growing problems with humans' environmental impact. As more nations develop metropolitan centers and suburban lifestyles, demand for metals like aluminum, iron, and copper will continue to rise. In the extraction of smelter grade alumina from bauxite minerals the caustic by-product, called red mud, is treated as a waste material and goes on to affect wildlife negatively. In recent years there has been a lot of research into the possible applications of red mud to have more of it used as a product or resource rather than a waste product.

Investigating the SARS-CoV-2 ORF 8 Accessory Protein: Expression, Purification, and Structural Determination

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Laney Hedgeman and Caroline Salha

Research Mentor(s): Thomas Leeper

In order to provide insight into potential therapeutic breakthroughs for the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), more research must be done to understand the structure and function of its proteins. The open reading frame 8 (ORF 8) accessory protein is particularly unstable on its own outside of the viral envelope but can be stabilized when bound to the small ubiquitin-related modifier (SUMO) protein. The stable ORF 8-SUMO protein complex can be expressed and purified using familiar techniques and later characterized with nuclear magnetic resonance (NMR) spectroscopy, thus allowing us to gain knowledge about the role it plays in viral invasion. Our research this year focused on optimizing the purification process to begin more informative studies in later semesters. We have been successful in expressing the ORF 8 protein and purifying it in its denatured, SUMO-tagged form. Future aims include cold-buffer refolding and subsequent SUMO-tag cleavage, or possibly performing NMR studies with the SUMO-tag still present.

Synthesis and Characterization of Azaborine-Boronic Acid Photoinduced Electron Transfer (PET) Fluorescence Sensor for Monosaccharides

Presentation - [Join now.](#)

3:20pm – 3:35pm

Graduate Student(s): Robert Hughley

Research Mentor(s): Carl Jacky Saint-Louis

The process of detecting monosaccharides is useful in tracking and getting fast results about the presence of sugar within a system. Over the past decades, boronic acid derivatives such as ortho-aminomethyl phenylboronic acid have been utilized in sugar sensing systems because of the strong binding affinity of boronic acids to saccharides. Here, we designed a fluorescence turn-on probe capable of detecting monosaccharides by linking ortho-aminomethyl phenylboronic acid, as a photoinduced electron transfer (PET) sensor, to an azaborine fluorophore, resulting in the intensification of the azaborine's emission in the presence of fructose. We will investigate the binding affinity of the novel azaborine-boronic acid PET sensor with multiple monosaccharides as well as tuning the preference of the sensor to a particular monosaccharide. We will also investigate tuning the azaborine fluorophore with the addition of electron –withdrawing and –donating substituents such that the emission wavelength of the fluorophore is near the IR region.

The Importance of Safety Practices in the Petroleum Industry

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Michaela Crowe

Research Mentor(s): Bharat Baruah

Petrochemicals are highly demanded products being manufactured to sustain daily processes that require energy. Jobs in petrochemical production pose a higher rate of hazard, injury, and possibly death than other chemical industries. Intensive safety measures must be utilized to promote safe and efficient petrochemical production to satisfy the ever-growing demand. Threats that can arise from exposure to hazardous chemicals, explosions, and problems stemming from operating large machinery must be adequately assessed to ensure that minimal incidents occur in the future. This presentation will review safety hazards that have posed and continue to pose threats to workers in the industry and how close research, intensive training, and regulation on a global scale must be utilized to promote safety in the petroleum industry.

Bioanalytical Determination of Glucose Concentration in Sports Drinks using UV/Vis Spectroscopy

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Laney Hedgeman and Brianna Bond

Research Mentor(s): Wei Zhou

The purpose of our project is to indirectly monitor the enzymatic activity of glucose oxidase as it reacts with the glucose present in sports drinks through the quantitative analysis of the generated ferricyanide. As glucose oxidase catalyzes the oxidation of beta-D-glucose in the presence of oxygen, D-glucono-1,5-lactone is produced along with hydrogen peroxide. The hydrogen peroxide is used in a subsequent reaction with ferrocyanide catalyzed by horse radish peroxidase to produce water and the chromophore ferricyanide. This compound absorbs in the ultraviolet/visible spectrum at 420 nm, which can be quickly measured using Ultraviolet/Visible Spectroscopy. Since the molar ratio of each component in this reaction mechanism is 1:1, the total concentration of glucose can be found by calculating the total concentration of ferricyanide using Beer's Law, and that value can be compared to the glucose values listed by manufacturers on product labels. By unconventionally applying the biochemical principles of enzyme kinetics to quantitative analysis for the purpose of verifying reported ingredient concentrations in food, this project encourages students to explore alternative approaches to familiar laboratory techniques and consider new uses for common instruments.

Electrochemical and Spectroscopic Characterization of Cerium Salts and Nanoceria Material

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Emily Velarde

Research Mentor(s): Wei Zhou

The nanoscale form of cerium oxide, nanoceria (nano-CeO_x), has drawn great attention in recent years in electrochemical, nanomaterial research and medicinal studies due to its antibacterial properties, UV absorption, and its biochemical function as possible radical scavenger. Many new synthesis methods have achieved uniform and biocompatible nanoceria particles, and our lab has created cerium oxide particles that shows UV/Vis. absorption and X-ray patterns similar to the commercial nanoceria and nanoceria made in other research laboratories with novel synthetic methods. This study focuses on characterizing and comparing electrochemical properties of cerium inorganic salts and synthesized nanoceria. Preliminary results have observed the redox peaks of Ce³⁺ and Ce⁴⁺ ions such as cerium (III) nitrate on platinum electrode using cyclic voltammetry, square wave voltammetry, and other electroanalytical and spectroscopic techniques. When nanoceria is added in an electrochemical cell or is deposited on the surface of a working electrode, the redox behavior exhibited by the introduced or deposited nanoceria is compared with the redox behavior of free aqueous cerium ions from salts. Our observation and analysis will help characterizing the electrochemical properties of the nanoceria and help explain its interaction with biomolecules when introduced in living cell and other biochemical conditions.

Ecology, Evolution, and Organismal Biology

The Veiled Lady Fungus

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Nick Parbhoo

Graduate Student(s): Grace Cope

Research Mentor(s): Clint Penick

*This semester I studied the Stinkhorn mushroom *Phallus Indusiatus*. The plan of this research is to develop a protocol for growing this fungus and using it in collaboration with research on its web-like properties of the unique veil produced by the fruiting body. This will be distributed to teams of engineers as well as NASA for Dr. Penick's research. Due to logistics of receiving spores from across the world, we still have not been able to begin growing these mushrooms. However, I have described a protocol that we will follow in order to grow. The protocol contains detailed descriptions on how and when to add certain spawn materials or substrates. It also describes when it is necessary to supplement FAE (fresh air exchange) as well as optimal temperature and humidity settings for best possible growth. I developed this protocol through research online as well as personal experience with cultivating oyster mushrooms, *Pleurotus ostreatus*. I have also written a presentation regarding this species which Dr. Penick will present to his NASA collaborators. This presentation includes general information like background information, where this species is found in nature, the history of its use in humans (medicinal as well as culinary), speculation for its web-like veil, or insidium, how it has been previously cultivated as well as how it is currently cultivated, and the history of its phylogeny.*

Connecting Aboveground and Underground Effects of Temperature on Bumble Bee Colonies (*Bombus impatiens*)

Presentation - [Join now.](#)

9:40am – 9:55am

Graduate Student(s): Francis Mullan

Research Mentor(s): Clint Penick

Declines in bumble bee abundance and diversity across continents have been linked to rising global temperatures associated with climate change and the urban heat island effect. Bumble bees are common, diverse, widespread, and are among the most highly contributing pollinators for a wide variety of wild plants and cultivated crops. Thus, the impact of rising temperatures will have a negative effect on not just the bees themselves, but also the wild and cultivated plants that depend on these animals. While a growing body of research has considered the effects of temperature on individual bees, much less is known about how rising temperatures may affect bees collectively at the colony level. Colony performance is heavily influenced by nest temperature, which affects brood development, colony growth, and reproductive output. To understand the effects of environmental temperature on the colony as a whole, we measured temperature inside simulated bumble bee nests both aboveground and underground. The results of our initial experiment suggest that bees in outdoor aboveground nests experience greater temperature extremes and daily temperature swings than bees in underground nests. Therefore, bumble bees in commercial box nests used for field crop pollination may experience greater stress than their counterparts nesting naturally underground. We plan to conduct further experiments this spring and summer to study how nest temperature varies among a range of natural and commercial bumble bee nests, and we will assess how well bumble bee colonies are likely to cope with increased temperatures due to climate change and urbanization.

You Are What You Eat: A Biodiversity Study of Fast Food

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Amjad Alkawam and Thomason Gilchrist

Research Mentor(s): Clint Penick

Biodiversity is often used as a measure of ecosystem health, but rarely do we think of the food we eat in terms of biodiversity. Nevertheless, the majority of foods we eat represent individual organisms that can be classified based on their genus and species. Here we applied biodiversity science to a novel habitat: fast food restaurants. Our project focuses on recording all of the major ingredients/nutrients in meals at fast food restaurants and comparing this to the diet of a typical college student. We organize these ingredients with both their genus and species names in a database, and we used this data to determine the species diversity and richness of the food that students eat. The diversity of diet likely has real world consequences in terms of human health, particularly as it relates to the microbiome. Most microbes in the human gut come from what we consume, a majority from undigested fibers in the large intestine. These gastrointestinal microbes affect the digestive system in various ways including helping with digestion, inflammation, insulin resistance, and even obesity. Therefore, our study hopes to understand how food availability may influence gut health.

English Ivy Removal and Restoration of Biodiversity in a Piedmont Forest

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Collin Anderson

Research Mentor(s): Matthew Weand

Invasive species threaten biodiversity through their potential to out-compete native species. The Fernbank Forest is a unique forest in Atlanta, Georgia, where English Ivy is the major invasive. In many restoration efforts that remove invasive species, the recovery of native plants is compromised by disturbances from restoration processes, i.e., chemical treatment and mechanical digging. However, disturbance was minimized at Fernbank by removing the invasive species by hand. We took advantage of this effort to examine the recovery of native species, surveying forest plots with lower, middle, and upper elevations. We compared the diversity and percent cover of control plots (containing Ivy) to removal plots. We hypothesized that removal of English ivy would result in higher native plant biodiversity. Based on observations of deeper, richer soil and higher species richness in riparian zones, we also predicted that plots in lower elevations would show greater diversity after removal compared to the higher elevation plots. From 2018 to 2020, removal plots, and surprisingly control plots, showed an upward trend in diversity. Removal plots were consistently more diverse and showed a faster rate of recovery than controls. Removal plots showed a 78 percent increase in diversity while control plots showed a 49 percent increase. There was a significant difference between upper and lower elevation removal plots in 2018, but that difference was no longer significant in 2020. These findings will help future restoration efforts by providing data on the effectiveness of these restoration methods, as well as provide a reference from which to set recovery expectations.

Urbanization and Insects: A Contrast in Trends between Latitudinal Temperature Gradients and the Urban Heat Island Effect in Cities along the Eastern United States

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Zach Peagler and Layne Buttram

Research Mentor(s): Clint Penick

*Urbanization is associated with a range of biological stressors, including increased local temperatures due to the urban heat island effect. In individual cities, increasing temperatures are associated with declines in biodiversity. This contrasts with major trends outside cities, where biodiversity generally increases with temperature along latitudinal and elevational gradients. To understand the interaction between the urban heat island effect and latitudinal trends in biodiversity, we quantified species richness of a common urban insect group (ants) in four cities (Boston, Queens, Baltimore, and Raleigh) that span a latitudinal gradient along the eastern coast of North America. We collected ants using baits placed at the base of a single red maple (*Acer rubrum*) at 128 locations across cities. At each tree, we continuously measured temperature and humidity using iButton temperature loggers over the course of 11 months in 2013. We predicted that species richness would increase along a latitudinal temperature gradient from the coldest (Boston) to the warmest (Raleigh) cities. We also predicted that within cities, there would be a negative relationship between temperature and species richness. Our results supported both predictions, suggesting that the urban heat island effect disrupts large-scale trends in biodiversity along ecological gradients. These findings are relevant to future research concerning the effects of human development on ecological processes and trends, particularly those involving weather and climate disruptions.*

Functional Morphology of Ant Cuticle Sculpturing

Not presenting.

Undergraduate Student(s): Katy Chon and Rebecca Senft

Graduate Student(s): John Paul Hellenbrand

Research Mentor(s): Clint Penick

Taxonomists have long used the fine patterns and textures on ant cuticle to distinguish one species from another. To describe these patterns, they have invented a lexicon of highly descriptive terms that can challenge even the most ardent student of myrmecology. We created a simplified categorization system to aid taxonomic work and associate clear textural differences with functionality. The system sorts all cuticle textures into six categories: Striate, Reticulate, Punctate, Hirsute, Tuberos, and Smooth. We apply this system to a diverse set of genera within Formicidae and find that identification is consistent and robust. Little is known about the functionality of these textures and here we aggregate all current hypotheses into three broad categories - Microbial, Structural, and Mechanical.

Scaling Properties of Honeycomb across Social Bees and Wasps

Presentation - [Join now.](#)

2:00pm – 2:15pm

Graduate Student(s): Grace Cope

Arizona State University Collaborator(s): Derek Goss and Dhruv Bate

Purdue University Collaborator(s): Nikhilesh Chawla

Other Collaborator(s): Alex Grishin

Research Mentor(s): Clint Penick

The regular cells of honeycomb have fascinated scholars and mathematicians for millennia, yet research continues to produce new insights into the evolution and structural properties of hexagonal nests. Humans use hexagons in construction to provide strength while using minimal material, and bees and wasps have evolved hexagonal nests for the same reason. It is not just the hexagonal cell that provides structural properties to these nests, but also individual cell parameters including wall thickness and rounding in cell corners. Here we measured these cell parameters in the nest cells of 75 bee and wasp species that vary in diameter and materials (wax, paper, mud, and a combination of mud/paper). There are two ways to increase the strength of honeycomb as the cell diameter increases: (1) increasing wall thickness, which increases weight and materials used, and (2) rounding the corner angles (“corner radius”), which in honeybees increases comb strength while conserving material. We hypothesized that as nest cells increase in diameter, we would see increases in corner radius and wall thickness, though we predicted corner radius would more significantly conserve nest material. We predicted that corner radius and wall thickness would be more important in nests constructed from wax and mud than paper due to the materials’ strength and stiffness. After measuring nests using a Keyence imaging system, we found support for both hypotheses. Furthermore, we have now begun to map traits across the Hymenoptera phylogeny to understand how the hexagonal nest structure itself evolves. Bees and wasps show economy of nest material use by using cell geometry, rather than added material, to increase strength, which offers applications for bio-inspired design and engineering.

Differences in Thermal and Physiological Properties of Organically and Conventionally Grown Tomato Plants

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Hannah Elliott

Research Mentor(s): Mario Bretfeld

Post-harvest food waste is in part the result of increasingly long supply chains driven by urbanization and globalization that jeopardize food security of billions of people. The shelf life of fruits and vegetables is directly linked to the rate of post-harvest metabolic processes driven by cellular respiration – a process that releases heat. This heat in turn may speed up respiration and thus shorten the commodity’s shelf life. The thermal properties of a fruit or vegetable depend on its physical and biochemical properties, which in turn depend on the environmental conditions in which it was grown. Many fruits and vegetables, including tomatoes, are significantly different in their biochemical composition when grown organically compared to conventionally. The effects of different biochemical composition on thermal properties, and thus the shelf life of fruits and vegetables, are observed in this study. We compared organically grown tomatoes with conventionally grown tomatoes regarding their

thermal signatures utilizing cutting-edge plant physiological measurements (e.g. leaf-level gas exchange, chlorophyll fluorescence). The results from this study we conclude that organic plants show higher rates of respiration through the observed higher thermal properties. In addition, the rates of transpiration were greater in the ____ watering treatment. Cambridge University points out “consumers’ willingness to pay for marginal changes [associated with organic] production practices that lessen the impact on the environment...[in addition to being] grown using less water” (Maples et al., 2017). The tomatoes being grown at the KSU Field Station are used for local consumption on campus and around the city of Kennesaw. With the results from this study, we suggest that the KSU Field Station continue using their organic blend and using the [100% / 120%] watering treatment in order to maximize yield and quality and minimize waste.

Sexual Dimorphism in Head Shape Among Spelerpine Plethodontid Salamanders

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Kelly-Ann McDonald and Tyshiona Brandon

Research Mentor(s): Todd Pierson

*Sexual dimorphism is the difference between sexes of a species in any trait except their sexual organs—including the organisms’ size, appearance, and more. In the “brook salamanders” (genus Eurycea), males have secondary sexual characters that function in the location, courtship, and mate-guarding of females and that cause sexual dimorphism in overall head shape. In this study, we collected quantitative data from museum specimens to evaluate evidence for sexual dimorphism in other species—the red salamander (*Pseudotriton ruber*), the mud salamander (*Pseudotriton montanus*), and the spring salamander (*Gyrinophilus porphyriticus*)—from the tribe Spelerpini within the family Plethodontidae. For each specimen, we measured the head width and snout-vent length and photographed the ventral view of the head, and we determined sex through dissection and/or the examination of cloacal morphology. We then used geometric morphometric methods to place 7 landmarks on photographs of the ventral view to get an accurate representation of the differences in head shapes. We included landmarks on each side of the widest part of the jaw of the salamander and two landmarks to each side of the snout, with one landmark directly in the middle of the snout. Our results reveal differences in head shape among species and between sexes, and we discuss how these differences might relate to their reproductive behavior.*

Meta-Analysis on the Effects of Temperature and Precipitation on American Chestnut Hybrids

Presentation - [Join now.](#)

10:20am – 10:35m

Undergraduate Student(s): Austin Flippo

Research Mentor(s): Mario Bretfeld

*The American chestnut (*Castanea dentata*) is widely considered one of the most important trees, both ecologically and economically, in the eastern United States. Unfortunately, it has been almost entirely removed from the overstory by a fungal pathogen named chestnut blight (*Cryphonectria parasitica*). There have been many attempts at creating a blight-resistant species of chestnut. Ongoing studies test*

several hybrid American chestnut species regarding their resistance in greenhouse settings and in the field. One field study has been growing several hybrids for over ten years in three different states (Virginia, Tennessee, North Carolina) but did not include the impact of local climate on tree growth and survival. We performed a meta-analysis using publicly available NOAA weather station data and tree growth data gathered from the aforementioned multistate chestnut growth project. Using R-Studio, we compared relative growth rate (RGR; approximated via year-to-year percentage differences in height) with regional, annual temperature and precipitation data. We found precipitation and warm temperatures had little to no effect on RGR, while cold temperatures had a statistically significant negative effect on three out of five species studied: American chestnut, Chinese chestnut, and the B3F3 hybrid. Our study is a great example of how meta-analyses can be used to find valuable new information in pre-existing data sets during the ongoing COVID-19 epidemic that limits field work.

Identification and Comparison of Arbuscular Mycorrhizal Fungi and Soil Microbiomes Between American Chestnuts and Surrounding Hardwoods

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Sarah Andrews, Geoffrey Eger, and Isabella Vahle

Research Mentor(s): Paula Jackson

*Background/Questions/Methods: The introduction of the Chinese chestnut blight in 1904 decimated native American chestnut (*Castanea dentata* (Marshall) Borkh.) populations. In this study we aim to: 1) document the location of individual chestnuts in our vicinity; 2) document healthy versus blight infected individuals; 3) characterize putative differences in the soil microbiome between infected and non-infected individuals, as well as between chestnuts and hardwood neighbors. With this information we hope to provide new insights into mechanisms that may enhance blight and fungal resistance in American chestnuts through the understanding of the interactions between the trees and their surrounding soil microbiome. Soil samples were collected 1 m north of the base of each of six of the chestnut trees located and 1m from the base of one hardwood tree within 5 m of each chestnut and aligned to one cardinal direction. Also, 2-3 root samples were collected approximately 5 m from the base of each individual chestnut. DNA was extracted from soil and root samples using extraction kits, replicated, confirmed using nanodrop dsDNA analysis and prepared for outsource sequencing. Results/Conclusions: Thirty-two individual chestnut trees have been identified, with a subset of six mature trees used for this study. Only one is currently known to be infected with Chinese chestnut blight. We are in the process of DNA extraction from soil and root samples, after which samples will be sent off for analysis to examine the metagenomics of taxa present in the soil microbiome around the mature American chestnut trees. Thus far, nine samples from three different trees have successfully undergone extraction and have been analyzed for dsDNA content using a Nanodrop.*

Does Urbanization Affect Female and Male Guarding Behavior in European Starlings?

Not presenting.

Undergraduate Student(s): Nikita Jain

Research Mentor(s): Sarah Guindre-Parker

*Urbanization drastically impacts biodiversity and can create stress for populations experiencing life in urban centers. In free living European Starlings (*Sturnus vulgaris*), adults of both sexes provide for and guard the young during their development to independence (called fledging). It's remains unclear whether urbanization changes guarding behavior of adults due to increased threats in urban areas. We used a multi-site dataset collected on free-living birds of both sexes to identify if there was a larger percentage of time spent guarding the nest in the urban setting than the rural one. More specifically, we wanted to see if the dangers and threats of the urban environment induced a need for greater nest defense by adult starlings. We also examine the difference in the behavior of parents to urbanization by sex—since males usually are more territorial, we hypothesize that males may guard the nest most in urban areas compared to rural males or compared to females. We will discuss how these results may help us design cities that are more bird-friendly.*

In Our Own Image: Do Images of Endangered Apes with Humans, and Human Artifacts, Negatively Impact Perception Regarding Their Conservation Status?

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Ayomikun Akin-David

Research Mentor(s): Jared Taglialatela

All four nonhuman Great Ape species, bonobos, chimpanzees, gorillas, and orangutans are endangered in the wild. Their greatest threat is human activity resulting in habitat destruction, poaching, and the illegal pet trade. In response, there are a number of sanctuaries and other organizations that are dedicated to Great Ape conservation. Social media platforms provide these organizations with a fast and effective formula for displaying information to many individuals. Photographs and videos of Great Apes are often used to promote awareness of the species. Frequently, however, these images portray individual apes with human artifacts or in human contexts (e.g., wearing hats or sunglasses, laying on a couch, etc.). Images such as these can be engaging to an audience and can serve individual organizations' missions by motivating people to care and thereby increasing resources for much-needed conservation efforts. However, preliminary research has suggested that displaying nonhuman apes in human contexts or with human artifacts may, in fact, give the impression that they make good pets and are not endangered, promoting the illegal trading of the Apes. This project aims to determine if individuals' perceptions of the conservation of Great Apes are influenced by the images of Great Apes that they see. Human subjects will be presented with images of chimpanzees in human/nonhuman contexts as well as with, and without, human artifacts and asked to respond to a number of questions regarding their suitability as pets and conservation status. The goal is to determine if some imagery of nonhuman great apes, used by the very organizations that aim to conserve them, may actually be detrimental to Great Ape conservation.

Bringing Down Costs with Code: Measuring Snow Depth from Photographs Using R

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Brandon Crasto

Research Mentor(s): Mario Bretfeld

The purpose of this project was to obtain the snow depth from repeat photographs taken from low-cost trail cameras, a potentially more cost-effective way to measure snow depth compared to using expensive equipment or by manually reading snow sticks. Our project attempts to use color segmentation to identify snow and track the changes to it over time. The images were taken at the Chimney Park AmeriFlux site in southeastern Wyoming between 2018 and 2020. The data obtained from the images were compared against the data from a high-precision snow depth sensor. A two-step algorithm was written in R for to obtain the snow depth from the images: The first step was to break down the photograph into two clusters of color and store the sizes of the clusters as a total percent of the photographs. The cluster that had higher levels of blue was detected as snow and had its total percent stored to be compared against the data obtained from the snow sensor. When compared to sensor data, our approach performed reasonably well with an R-squared for the full year of 2019 of 0.44. The algorithm performed the best during the snow melt in Spring of 2019 with an R-squared of 0.60. Ongoing challenges of our approach include the shifting of the trail camera throughout the year which results image misalignments, seasonal and daily changes in lighting from the sun because it changes how the camera perceives the colors, and the detection of snow when there is no snow. Nevertheless, our results so far show promise in an alternative, cost-effective method in obtaining snow depth.

Understanding How Temperature Influences European Starling's Reproductive Success

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Grace Fatoyinbo

Research Mentor(s): Sarah Guindre-Parker

*Many habitats face fluctuating temperatures year-round. The animals that live there are typically able to adjust their behaviors to match these conditions. When temperatures become too extreme, however, it could potentially start having a negative effect on the animal's reproductive success. In birds, for example, severe climate can affect their eggs and nestlings due to nestlings lacking the ability to thermoregulate. The parents then have to bear the responsibility of thermoregulation for their young, through a behavior called incubation or brooding. European starlings (*Sturnus vulgaris*) are a species of birds common across the United States where both parents incubate their eggs and or brood their nestlings. In order to understand how the weather could impact these birds, we used nest cameras to record the behaviors of starling parents from March to June of 2020. We then used NOAA historical weather data to assess whether temperatures during the daytime shaped the number of eggs these starlings laid (clutch size). We also checked to see if weather temperatures effected the incubation and brooding behaviors of parents when they were keeping their nestlings warm (thermoregulation). We hypothesized that extreme temperatures (too warm or too cold) would results in less eggs at the nest, and more parental care from the parents.*

Sampling Bee Diversity at Floral Resources across KSU Properties

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Myranda Hernandez, Audrey Quenneh, and Christelle Price

Graduate Student(s): Francis Mullan

Research Mentor(s): Clint Penick

Bees are a diverse group of pollinators, with over 500 species recorded in the state of Georgia alone, and are crucial for the pollination of many crops and wild plants. Many species of bees specialize in pollinating specific varieties of plants, and thus bee diversity is dependent on flowering plant diversity. It is currently unknown what bee species are supported by the flowering plants on KSU properties. Here we aim to identify patches of flowering plants on Kennesaw State University's main campus and the KSU Field Station, and to survey these patches to see what diversity of bees they may support. We plan to collect bees in these surveys using hand nets and bee bowls, and to create a reference collection of the bee species found on these KSU properties.

Natural and Anthropogenic Drivers of Stream Macroinvertebrate Diversity over Time in Georgia, USA

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Precious Slade

Research Mentor(s): Nicholas Green

We investigated how aquatic macroinvertebrate communities in streams of Georgia, USA, changed over time in relation to trends in land use and human activities within watersheds. Stream organisms respond to natural and human influences at multiple spatial and temporal scales. The state of Georgia, USA, has approximately 70,000 km of perennial streams and rivers in 53 USGS HUC8 watersheds. These streams cross land at 0 to >1400 m elevation, across 6 EPA level III ecoregions, and a wide range of land use types. Stream biodiversity is an important indicator of overall watershed and stream health. Understanding how different factors influence stream organisms across spatial and temporal scales is crucial for conservation of aquatic communities and ecosystems, as well as promoting water quality. We integrated data from a state-wide biomonitoring program (Georgia Environmental Monitoring and Assessment System) collected 2000-2018 with public spatial data characterizing the hydrology, land cover, human population density, and other factors within the sampled watersheds. The dataset included 496 sampling sites in every major watershed. We then used boosted regression trees to identify environmental drivers of stream biodiversity while accounting for nonlinearity and interactions between predictors. Our primary hypothesis is that stream biodiversity will decrease over time, with greater decline in watersheds with more intensive human land use. Our results will identify anthropogenic impacts on Georgia stream biota in their spatial and temporal context. This is critical as human land use intensifies (e.g., suburban and urban development) and these effects interact with pre-existing natural gradients such as elevation and latitude. Our findings have the potential to inform science-based management of Georgia streams for biodiversity conservation.

Environmental Science

Environmental Impact of Disposable Masks in Georgia during the Ongoing COVID-19 Pandemic

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Latifat Giwa, Rebecca Senft, Jeavanie Dersames, Deshawn Prewiitt, and Meriem Elomrani

Research Mentor(s): Thomas Leeper

The onset of the COVID-19 pandemic requires masks to become a common item for daily use, with the WHO estimating that at least 83 million masks are required per month to slow the spread of the virus. As a result, masks have become a new source of pollution in the environment, including bodies of water. Fourier-transform infrared spectroscopy studies confirm that masks are a contributor to microplastics that harm aquatic life. Additional studies indicate that mask waste is not being properly handled within waste treatment sites. The purpose of this study is to determine the chemical, ecological, and economic effects that disposable masks have on Georgia waterway systems. We will conduct a Likert scale survey to estimate the possible environmental effects of disposable mask waste in Georgia during the ongoing pandemic; survey participants will include waste management professionals in governmental waste facilities in Georgia counties. A literature review will be completed on why Fourier-Transform Infrared Spectroscopy techniques are preferred for the face mask's microplastics' chemical analysis. We anticipate finding how often masks are being found within Georgia's water filtration plants. As mask use rises, we should observe a rise of masks in the water filtration plants. Additionally, we will research what type of plastics that masks are made from to explore what this additional waste might mean for the water quality in the state.

Mathematics

Classifying Highway Traffic Patterns with Neural Networks

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Jordyn Burman

Research Mentor(s): Min Wang

We observe, analyze, and visualize trends and patterns in highway traffic data using techniques of exploratory data analysis. Subsequently, we reformat the dataset and train a neural network to classify highway traffic patterns.

A Single-Cell Based Mathematical Model for Mammalian Cell Migration

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Christopher Boon

Research Mentor(s): Yizeng Li and Glenn Young

Mammalian cell migration plays a fundamental role in biological processes such as wound healing, cancer metastasis, morphogenesis. Cells utilize different mechanisms for migration depending on their

microenvironment. On two-dimensional surfaces, migration is driven by actin polymerization. While in confined channels with high hydraulic resistance, migration can be driven by water permeation. Water permeation is driven by a polarized distribution of membrane proteins, including ion channels and aquaporin. Taking cancer metastasis as an example, breast cancer cells are known to have an overexpression of ion channels and pumps and sometimes migrate through confined environments that have elevated hydraulic pressure. This suggests that breast cancer cells can migrate in an ideal environment for the use of water permeation. Despite the important role of ion and water transport(flux) in cell migration, the mathematical formulation of this mode of migration is relatively new. There are few models that allow the study of how ion and water fluxes through ion channels affect cell migration. We develop a single-cell based model for cell migration capable of studying directional solute fluxes. Model components such as actin polymerization and depolymerization, focal adhesions, polarization distribution of ion channels and pumps, external hydraulic resistance, cytoplasmic flow, and membrane tension are modeled through a set of coupled differential equations and are solved numerically in MATLAB. Steady state and transient states of cell migration will be discussed.

Environmental Impact on Competition in Ecological Communities

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Isabel Ouko

Research Mentor(s): Glenn Young

We study the effects of environmental feedback on the ecological competition by analyzing the classic Lotka-Volterra model coupled with a simple model of the environment. In particular, we look for ways in which feedback between competing populations and the environment stabilizes or destabilizes coexistence between the species. To do so, we use a combination of mathematical analysis and computer software such as Matlab.

Stress Reaction System Modeling

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Vanessa Phan

Research Mentor(s): Pengcheng Xiao

The HPA axis, a stress responsive system, is responsible in regulating the production of cortisol. Cortisol level varies corresponding to different psychiatric disorders resulting in divergent strength of negative feedback. We can interpret these variabilities into diagrams for quantitative analysis using nonlinear ordinary differential equations (ODE). This model was formulated to illustrate the cortisol dynamics in a twenty-four-hour window. The parameters used in this ODE were evaluated by clinical data and global optimization and also went through bifurcation analysis. We collected data from examination of numerous possible inputs, including chronic and acute stress. Starting with the cortisol dynamic model, we explored the changes and impacts with different variations and parameters. The cortisol dynamics model was tested in 3 subjects, Normal, PTSD, and Depression with an expanded stimulating time window (compared to the original 24-hour range from the literature). After the results

analysis, the outcomes support the sufficiency of this cortisol dynamic model. We have come to an agreement with the reference literatures. Further investigation may be carried out to validate this model's proficiency as well as develop its potential in psychiatric disorders treatments.

Double Crescent Moon Reflection in Coffee Mugs

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Daniel Reyes

Research Mentor(s): Tsz Chan

A phenomenon referred to as the double crescent moon reflection can be seen at the bottom of a circular mug when a light source is set to shine at the mug from above it at an angle. Using basic light properties, assumptions from physical laws, and calculus, a set of mathematical equations are introduced to describe the phenomenon through multivariable and parametric functions. The set of equations serve as a tool for the discovery of the conditions that lead to an experimentally verified relationship between incoming light rays and their location of reflection at the bottom of the mug. A second set of equations are introduced to describe a parabolically shaped mug where a light source shines at an angle and reflects onto a flat surface. Using the same methodology and assumptions, a final relationship is again identified. The complete results are represented by two equations, for the two different shapes, that express the aforementioned relationship between incoming light ray paths and final reflection location at the bottom of the mug. This talk will cover the process of finding these results, as well as the intent to discover a more general model for the situation.

Molecular & Cellular Biology

The Phoenix Sign: Is it Due to Vasodilation? Blinded Prospective Comparing the Effects of Papaverine to Lidocaine without Epinephrine

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Julia Aguirre

Research Mentor(s): Stephen Barrett

A neurological phenomenon has been observed clinically that when after a small amount of 1% lidocaine (usually less than .5cc's) has been infiltrated adjacent to the Common Fibular (Peroneal) nerve under sonographic guidance, in patients with drop foot, or significantly weakened motor potentials of the lower extremity dorsiflexors (Extensor Hallucis Longus (EHL), Tibialis Anterior (TA), and Extensor Digitorum Longus (EDL)), the patient will regain partial or full dorsiflexion temporarily during the effect of this nerve block. This has been named the Phoenix Sign, in reference to ancient Greek folklore, as the non-functioning nerve (like the bird) becomes functional due to the effect of lidocaine, similar in a way that the mythical bird rose from the ashes. This sign has significant benefit to the diagnosis and assessment of Common Fibular (Peroneal) nerve palsy as clinically when a nerve does not manifest a Tinel's or Provocation sign it is believed that the nerve damage is so severe that

peripheral nerve decompression will not likely benefit the patient. However, when a patient manifests a “positive Phoenix sign” the prognosis has been greater than 90%--that the patient will gain improvement in motor function of the dorsiflexors of the lower extremity after surgical decompression. Thus, many patients with this crippling condition are not receiving definitive treatment because of the inability of standard clinical work-up and diagnosis. A “positive Phoenix sign” also differentiates a focal nerve compression peripherally versus a central CNS manifestation. It is hypothesized that this observation of improved nerve function is due to the vasodilatory nature of the local anesthetic. By comparing the block given with lidocaine versus papaverine (a known vasodilator), the vasodilation hypothesis can be tested. The purpose of this study is to help determine if this is a valid explanation for the phenomenon.

Cuticle Structure Variation in Pogonomyrmex

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Rebecca Senft and Katy Chon

Graduate Student(s): John Paul Hellenbrand

Research Mentor(s): Clint Penick

The exoskeleton is a unique biological innovation that allowed insects to radiate and dominate the globe. Exoskeletons provide numerous functions such as desiccation and abrasion resistance, defense against predators, and internal structures to attach musculature. The surface of ant exoskeletons is unique as they display a huge diversity of textures and patterns. The function of this sculpturing is unknown, however recently, efforts have been undertaken to group textures based on their proposed function. In this study, we examine the genus Pogonomyrmex, whose cuticle structure is a consistent pattern. We measure the average ridge width of each species within the Pogonomyrmex genus to explore whether the width is consistent throughout the species. The resulting widths may help inform what the purpose of the striation is and support consistency for cuticle structure within an ant genus.

Identification of Ngn-1/Neurogenin Transcriptional Controllers

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Claire Simms and Samantha Goss

Research Mentor(s): Martin Hudson

*Transcription factors are a class of proteins that specify when and where genes are transcribed. The transcription factor neurogenin is required for multiple neurodevelopmental processes during vertebrate embryonic development and mutations in this gene are implicated in a variety of human neurological disorders. Despite this, little is known about how this gene functions. Neurogenin is deeply conserved across phyla. As such, we can investigate neurogenin in simple organisms such as the nematode *Caenorhabditis elegans*, which has a close ortholog of neurogenin, *ngn-1*. Previous work in the Hudson lab revealed that *ngn-1* controls the expression of eight downstream transcription factors. However, the genes that control *ngn-1* itself are not known. This project aims to identify and validate *ngn-1* transcriptional controllers. We previously used the RNAseq dataset published by Packer et al.*

(Science, 2019) to identify transcription factors expressed in the “parent” cells of ngn-1 expressing cells. We hypothesize that these genes are required for ngn-1 transcription. This suggests that loss-of-function mutations in a gene required for ngn-1 transcription may show a similar phenotype to an ngn-1 loss-of-function mutation (embryonic lethality, axon guidance defects, cell fate specification defects, etc.). Unsurprisingly, many of the genes identified as candidate ngn-1 transcriptional controllers show lethal phenotypes. To validate our approach, we will need to design genetic crossing protocols to handle these lethal alleles and to cross appropriate reporter genes into these loss-of-function backgrounds to validate our hypothesis. This presentation will summarize our experimental designs, along with our preliminary results.

Catch Me If You Can!

Presentation - [Join now.](#)

9:40am – 9:55am

Undergraduate Student(s): Joshua Lummus and Juan Vasquez

Research Mentor(s): Ramya Rajagopalan

Pseudomonas aeruginosa is a Gram-negative opportunistic, often antibiotic resistant and nosocomial, pathogen. Many behavioral responses in P. aeruginosa are regulated by bacterial density-dependent cell-to-cell communication termed quorum sensing. P. aeruginosa relies on three regulons for motility: rhl, pqs, and las systems. Virulence is linked to motility type and is implicated with the human immune response. When preyed upon by Gram-negative Myxococcus xanthus DK1622, prey bacteria such as Escherichia coli and Staphylococcus aureus usually remain in place, even when motile. P. aeruginosa displays an interesting phenotype in that it flees from the advancing front of myxobacterial cells. rhl, pqs, and las transposon mutants of P. aeruginosa will be used in predation assays with M. xanthus DK1622. This will enable us to determine whether one or more of the quorum sensing systems are involved in the regulation of this fleeing phenotype.

Exploring the Microbiome of Korean Industrial Kimchi Fermentation Products

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Cynney Walters

Graduate Student(s): Daisy McGrath

Research Mentor(s): Tsai-Tien Tseng

Despite existing over millenniums, Kimchi, a historic side dish of Korean culture, has a cultivation process that remains poorly defined and difficult to control along industrial production lines. Traditionally, Kimchi is made through the process of fermentation, a chemical mechanism in which microorganisms convert sugars to alcohol or an acid. The variation in taste existing across different batches of identically prepared kimchi products supports the idea that the constituents of the kimchi microbiome are generally unknown. The objective of this research study is to classify microbial species from Korean industrial kimchi fermentation products and potentially discover novel phages. Next-generation sequencing (NGS), a tool used to sequence the genetic material of organisms, will be used to probe the kimchi microbiome and continue downstream bioinformatics. Shotgun metagenomic

sequencing, a technique of genome reassembly through regions of nucleotide overlap, will be used via a pipeline containing four software packages with customized settings in order to analyze the datasets: CutAdapt, Kraken2, Spades and BLAST. Our preliminary analysis on an NGS data set from Korean industrial kimchi products with NCBI accession number of SRX2725663 was used extensively throughout our research. 99.11% of the metagenome was identified, and .89% of unclassified reads remain. Of the reads identified, probiotics such as Weissella confusa and Bifidobacterium gallicum were present. Additionally, the presence of Escherichia coli and Enterococcus faecium are indicative of potential fecal contamination in the sample. Downstream analysis of unclassified reads will include BLAST searches. Furthermore, researchers on the project may seek to develop the complete genomes of phages as they have been known to have the capacity to serve as biocontrol agents.

Creating a Protein Chimera to Study Regulation of Muscle Diversity

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Shannon Scarboro

Research Mentor(s): Anton Bryantsev

Creating a protein chimera to study regulation of muscle diversity. Body muscles are made of many individual super-cells, called muscle fibers, that have distinct properties and determine every individual's strength and endurance. Initially all muscle fibers have identical characteristics but become differentiated into specific types in adults. The mechanism of such transition is not well understood, despite its obvious importance for shaping human physicality. Remarkable conservation of the muscle tissue enables us to use fruit flies to study the mechanisms of muscle fiber diversity. We hypothesized that the transcription factor Mef2 acts as a molecular switch that activates structural genes in embryos, but then suppresses the very same genes in adults. To test our hypothesis, we have designed and cloned Mef2::VP16, a chimeric protein that contains the DNA-binding domain from Mef2 and the transactivation domain from Herpes Simplex Virus. We are going to test Mef2::VP16 in flies with the Act57B reporter. Act57B is ubiquitously expressed in all embryonic muscles, but then becomes restricted to a limited set of muscles in adults. If our hypothesis is correct, the flies expressing Mef2::VP16 will reactivate Act57B activity in the muscles where it is normally not expressed, confirming the repressive action of Mef2 transactivation domain and its regulatory role in adult muscles. Since Mef2 is a conserved factor that is involved in muscle regulation in vertebrates and humans, we believe that our study will uncover a new conserved mechanism that underlies muscle tissue diversification.

Biocontrol of Foodborne Pathogens Using Bacteriophages

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Dzhuliya Ignatova, Erion Hogan, and Simone Dakare

Research Mentor(s): Jean Lu

Salmonella and Shigella are two important groups of foodborne bacterial pathogens. Salmonella causes an illness called salmonellosis while Shigella cause shigellosis (bacillary dysentery). The most common

symptoms of these illnesses are abdominal cramps, diarrhea, and fever. Shigella can also cause bloody diarrhea. It was estimated that each year Salmonella cause 93.8 million cases of gastroenteritis and 155,000 deaths globally. Shigella causes 164.7 million cases and 1.1 million deaths throughout the world yearly. People get these illnesses mainly by eating food or drinking water contaminated Salmonella and Shigella. Thus, to protect the public's health, it is crucial to effectively control of these pathogens in food systems. Bacteriophages (or phages) are viruses that kill bacteria. Phages have emerged as promising biocontrol agents against bacterial pathogens because 1) phages can cause rapid bacterial death, 2) phages do not replicate in foods unless their bacterial hosts are present, 3) phages do not infect humans and other animals, and 4) phages do not alter food color, odor, taste, and nutritional value. This project isolated two phages infecting Salmonella and Shigella. Both phages are tailed phages and belong to Siphoviridae or Myoviridae family. They have broad host range infecting several species. The kinetic study showed that the burst sizes of the two phages are about 100 phage particles per infected cell. Salmonella phage infection in cucumber juice (as a model food system) caused rapid cell lysis within 4 hours, resulting in 5- log unit reduction (or 99.999% decrease) in host cell concentration compared with the control.

Neurological Gene Jus is Associated with Aging-related Muscle Loss in the Fly Model of Sarcopenia.

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Soobin An and Melody Jabbari

Graduate Student(s): Kaveh Kiani and Christina Talley

Research Mentor(s): Anton Bryantsev

*Sarcopenia is a health condition in the elderly that is associated with degradation of muscle size, mass, and function. It can cause physical disability and, in extreme cases, death. The genetic aspect of sarcopenia is still not well understood. To shed light on sarcopenia mechanisms, we investigated muscle loss in aging fruit flies, *Drosophila melanogaster*. Our hypothesis was that aging-dependent muscle degradation can be affected by suboptimal functioning of the central nervous system (CNS). We used RNA interference and tissue-specific genetic drivers to induce a selective knockdown (KD) of the julius seizure gene (*jus*), which is associated with neurological phenotypes. Flies with CNS-specific *jus* KD (*elav>jus* KD) demonstrated seizures and paralysis after a brief mechanical stimulation (shaking). We have compared aged *elav>jus* KD flies, (with (+) and without (-) chronic shaking treatment), with genetically matched controls (*elav>+*, +/- shaking), as well as muscle-specific *jus* KD (*Mef2>jus* KD) flies. The muscle loss was evaluated by quantifying missing muscle fibers in the jump muscle. We found that all groups had some levels of spontaneous fiber loss with age. However, *elav>jus* KD flies (+/- shaking) had strikingly more lost fibers than control (*elav>+*, +/- shaking) or *Mef2>jus* KD flies. Surprisingly, chronic stimulation of seizures and paralysis by shaking was not a contributing factor to the exacerbated muscle loss in *elav>jus* KD flies. We conclude that even subtle, not apparently noticeable, abnormalities in the functioning of the CNS can stimulate aging-related muscle loss. Our results suggest that genetic causes of sarcopenia are likely to be associated with the genes associated with the CNS functioning.*

Cnd-1/NeuroD is Required for RME Head Neuron Cell Fate Specification in the Nematode Caenorhabditis Elegans.

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Genevieve Doxakis

Research Mentor(s): Martin Hudson

Transcription factors are proteins that control gene transcription. NeuroD is a deeply conserved transcription factor that regulates neuronal differentiation and pancreatic development. Mutations in this gene correlate with several neurological disorders, creating an imperative for further study. The nematode Caenorhabditis elegans has a NeuroD ortholog, cnd-1, which means we can use the powerful genetic tools available in this organism to investigate the role of cnd-1/NeuroD1 in nervous system development. Our preliminary observations revealed that cnd-1 loss of function mutants show exaggerated left/right head movement, suggesting the CND-1 is required for formation of the underlying head neuromuscular circuitry. In addition, previous work published by the Hudson lab showed that cnd-1 controls expression of another transcription factor, ceh-5, which is the C. elegans ortholog of human Vax2. ceh-5 is expressed in the RME GABAergic inhibitory motor neurons and the head muscles of C. elegans. In this study, we used an RME-specific fluorescent reporter gene, unc-25p::GFP, to investigate the role of cnd-1 in establishing RME neuron fate. Wild type animals (n = 20) showed around four GFP-positive RME head neurons, consistent with previously published work. However, cnd-1(gk718) null mutants showed a statistically significant loss of around 1-2 RME head neurons (n = 12 animals observed, p < 0.001). A pan-neuronal nuclear marker, prom-1::his-24::dsRED, was used to confirm neuron identity. These results suggest that cnd-1 may regulate a neurodevelopmental circuit required for normal inhibitory neuron cell fate specification and head movement. work is on-going to investigate the role of ceh-5 in this process.

Manipulation of the Microbiome in the Gut of the Fruit Fly to Alleviate Cadmium Bioaccumulation

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Natasya Tamba

Research Mentor(s): Anton Bryantsev

Cadmium (Cd) poisoning contributes to severe bodily detriments characterized by kidney failure, osteomalacia, and osteoporosis, otherwise known as Itai-Itai disease. The ingestion of cadmium contaminated foods primarily causes these conditions. There are no treatments to remove cadmium once absorbed, resulting in bioaccumulation. In this study, we are developing a method to manipulate the community of microorganisms (microbiome) living within the gastrointestinal (GI) tract of the fruit fly (Drosophila melanogaster), intending to use microorganisms to reduce the availability of ingested cadmium. The biodiversity of microorganisms within the GI tract is responsible for metabolizing substances that the body cannot perform. Introducing a microbe that can metabolize cadmium into an insoluble form in the gut microbiome might be key to reducing cadmium absorption. To confirm the microbe's effectiveness, the microbe itself must reach the GI tract and successfully colonize it. A germ-

free (axenic) population of flies bearing no microbial presence within their bodies was developed and maintained as our model. Repopulation using Escherichia coli was unsuccessful, suggesting that non-native bacteria may have a low success rate. We procured a culture of native bacteria from wild-type fly GI tracts to repopulate the axenic model. This attempt was successful, affirming that repopulation of an axenic GI tract is feasible. These results suggest that modifying the native bacteria to metabolize cadmium may be a valuable way for future experiments.

Spatial and Temporal Variation in the Physiological Profile of the Longleaf Pine Microbiome

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Gavin Treadaway and Jon Levesque

Research Mentor(s): Ramya Rajagopalan

The longleaf pine is an endangered species of tree that once covered ~90 million acres of land that is now estimated to only cover 3% of that. Longleaf pines are slow growing but offer better resilience to climate change driven disasters like wildfires or droughts than the faster growing pine trees. The interaction between plant and soil microorganisms is an emerging field. Soil microorganisms secrete chemicals into their surroundings causing subsequent release of root exudates from the root system of plants. These root exudates behave as signaling molecules for microorganisms to recruit beneficial soil bacteria to the plant root system, which can provide the plants with immunity to foliar diseases and pathogen infection. Studies have shown that bacteria on the root surface can protect aerial sections of the plant by promoting induced systemic resistance, a mechanism of increasing physical or chemical barriers of the plant. Our research involved characterizing the carbon-utilization profiles of soil microbiomes across both distance and time using BIOLOG EcoPlates with subsequent data analysis performed in R. Previous data from the lab indicates there are significant variations in microbial activity between the soil samples. New data will look at changes in microbial activity over time and different distances. By analyzing phenotypic data about compounds utilized by the microbiome we can better understand the intricate relationship between the microbiome and the above-ground plant community

Improving Endosomal Escape and Cytosolic Delivery of Macromolecules by Employing Calcium Dependent Cell Penetrating Peptide

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Will Clark

Graduate Student(s): Schuyler Gentry

Research Mentor(s): Jonathan McMurry

Cell-penetrating peptides (CPPs) can effectively transport macromolecules across the cellular membrane and into the cell's interior. However, many CPP's rely on covalent bonding to traffic their cargo into the cell. This covalent bonding is thought to lower the endosomal escape of cargo, therefore encouraging aggregation of cargo within the endosomes and decreasing the effective cytosol diffusion of the cargo. Our goal was to test the functionality of a novel CPP, TAT-calmodulin (TAT-CaM), which

utilizes calcium dependent, non-covalent bonding to transport its cargo. It was hypothesized that TAT-CaM would exhibit greater endosomal escape and increased cytosolic delivery of cargo. Images of fluorescently labeled cargo were captured by confocal microscopy in BHK21 cells to visualize the difference between these two cargo carriers. Results showed an increased level of diffuse signal in TAT-CaM positive images, while cargo trafficked using the covalently bound carrier displayed a punctate like signal pattern throughout the cells. Therefore, we conclude that TAT-CaM enhances endosomal escape and cytosolic delivery of cargo.

Voltage-Gated Sodium Channel Auxiliary Subunits

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Prem Patel

Research Mentor(s): Tsai-Tien Tseng

Voltage-gated sodium channels with auxiliary subunits are able to induce electrical activity in excitable tissues. Auxiliary subunits aid with transporting and biogenesis of principal subunits. Auxiliary subunits also have shown that they can possibly be drug targets for painkillers. The purpose of this research is to use phylogenetic and functional data to draw a conclusion of the evolutionary origins for each of the three families of sodium auxiliary subunits: $\beta 1$ and $\beta 3$, $\beta 2$ and $\beta 4$, and temperature-induced paralytic E (TipE). Through BLAST, it was found that there are a total of 1715 homologues for $\beta 1/\beta 3$ subunits, 4911 homologues for $\beta 2/\beta 4$, and 970 homologues for TipE. CD-HIT was used to narrow down the homologues to sequences with 90% similarity, decreasing the homologues to 576 homologues for $\beta 1/\beta 3$ subunits, 1749 homologues for $\beta 2/\beta 4$, and 162 homologues for TipE. Phylogenetic trees, correlating to each subunit, were made using sequence alignments of homologues to determine evolutionary relationships. The beta subunits had a common feature where $\beta 1/\beta 3$ and $\beta 2/\beta 4$ showed that there was one transmembrane helix. TipE showed that there were two transmembrane helices. Cysteine residue was found from the partial alignment of $\beta 1/\beta 3$ subunits which could cause epilepsy syndrome if mutations occur.

How AWC Neuron Defects Affect Volatile Chemotaxis in *C. elegans*

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Barrett Upton

Research Mentor(s): Martin Hudson and Karuna Kalichamy

**C. elegans* has a well developed nervous system and consist of 302 neurons. A big part of their nervous system is dedicated to recognizing environmental cues such as food, danger, or other animals. Chemosensory neurons enables them to be able to detect volatile and water-soluble cues. AIY interneuron receives chemical synapses from various sensory neurons including AWC sensory neuron. AWC neuron sense various volatile compounds like isoamyl alcohol, benzaldehyde and butanone. *C. elegans* EphR/ephrin is required for AIY neurite growth and morphology. In this study, we looked into the olfactory function of the AWC neuron and how AIY neurite growth affects AWC*

sensing. We are analyzing AWC olfaction on *EphR* mutant, *vab-1* and ephrin ligand mutants, *vab-2* and *efn-4*.

The Role of Biofilm Formation in Candida Auris Anti-fungal Susceptibility

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Kameron Downs

Graduate Student(s): Bethany Butts

Research Mentor(s): Christopher Cornelison

Candida auris is an emerging fungal pathogen that presents as a serious health threat that commonly causes nosocomial blood infections in the immunocompromised. Three distinct factors make this pathogen a global threat. First, it is drug-resistance, some isolates are resistant to more than one class of anti-fungal. Secondly, it causes nosocomial outbreaks and lives on finite for weeks. Third, it is commonly misidentified by diagnostic platforms. Recent research has found that like in other *Candida* species, biofilm formation maybe a key virulence factor for *C. auris*. In this study, we compared anti-fungal susceptibility of several *C. auris* isolates and other related *Candida* species. Various antifungals were tested against platonetic and adhered cells using crystal violet assay. The goal of this study is to see the importance of biofilm formation in *C. auris* antifungal susceptibility.

Identification and Characterization of Microbiota from the Gastrointestinal Tract of the Drosophila Fruit Fly

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Stephanie Sam

Research Mentor(s): Melanie Griffin and Anton Bryantsev

Heavy metal resistance by various microorganism has been demonstrated to be an effective potential source of bioremediation of contaminated environmental sites. Bacteria possess heavy metal-responsive detoxification genes that have been characterized by various groups and demonstrated to remove high levels of these metals, such as chromium, cadmium and lead, from contaminated soils and water. These systems tend to present as a single gene or gene-clusters in the chromosome of the bacterial host (*cadBD* or *cadium*, *chrA* for chromium, *pbrA* for lead) and are attractive candidates for genetic engineering of other bacteria that do not normally carry out these functions. Moreover, can we get a model organism to carry organisms that have been engineered for bioremediation purposes. The bacteria that naturally inhabit the gut of the fruit fly will be most adapted to live within that host system without harming the host. However, the *Drosophila* gut microbiome has been characterized and demonstrated to be taxonomically variable. We will generate pure cultures for genomic extraction and identification by DNA sequencing. Biochemical profiling will be conducted to determine metal sensitivity as well as antibiotic profiling (necessary for further genetic manipulations) using Biological microbial identification assays.

Determining Utility of CPP Delivery Systems in Microorganisms

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Arie Henderson and Darquis Grant

Research Mentor(s): Melanie Griffin

Fungus are found ubiquitously in every environment and can be used beneficial ways (biotechnology, pharmaceuticals, and fermentation science) or are human detriments (fungal disease). We seek to subvert fungal self-control by using a cell-penetrating peptide delivery system to target cells, mainly yeast, for expression of a new enzymatic function or to unknowingly take up an anti-fungal protein.

Lrp Plays a Role in Diverse Behavior-Response Systems in the Opportunistic Human Pathogen, Pseudomonas Aeruginosa

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Sheereen Abdulkabir

Research Mentor(s): Melanie Griffin and Ramya Rajagopalan

Our lab investigates the leucine-responsive regulatory protein, Lrp, in Pseudomonas aeruginosa. Utilizing a chromosomal gene knockout mutant, we have characterized altered phenotypes in swarming motility, biofilm-formation, siderophore-production, nutrient utilization and now predation response behavior. Many of these systems are known to be regulated by quorum-sensing (QS). In P. aeruginosa, N-acyl homoserine lactones (AHL) are signal molecules or autoinducers that activate the expression of three main cell density-dependent DNA regulatory systems. These systems, las, rhl and pqs, are hierarchal in such that las is the first to act which in turns affects rhl which finally acts upon pqs. In short, the AHL molecules are produced by inducer genes (lasI and rhlI) and released by cells and as the concentration builds in the population, surface or internal receptors (produced by lasR and rhlR) bind the signal molecules, which go on to influence gene expression of chromosomal genes. We seek to demonstrate that Lrp is involved in the cross-talk of these systems by combining the phenotypic analysis with a transcriptional study.

The Impact of Fungal Melanin Production on the Susceptibility to Volatile Organic Compounds

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Angel Jaimes

Research Mentor(s): Christopher Cornelison

White-nose syndrome (WNS) is a disease caused by the pathogenic fungus Pseudogymnoascus destructans. Since its emergence in North-Eastern America in 2006, WNS has been implicated in the death of millions of hibernating bats, leading to greater than 90% population declines of three formerly abundant species of bats. This massive decline in hibernating bat populations has vast ecological consequences. Researchers have estimated that if the hibernating bat population continues to decline at the current rate, the US agricultural industry will lose \$3.7 billion/year due to the loss of pest control

*services that these insectivorous bats provide. To mitigate the impact of WNS on susceptible bat species, researchers continue to explore strategies to prevent the spread of WNS and alleviate WNS related bat mortality. One of the most promising control methods that have exhibited in vitro success is the use of volatile organic compounds to inhibit mycelial growth and conidia germination in a contact-independent manner. However, an understanding of what cellular processes impact the virulence of WNS is crucial to the implementation of effective control methods. This research aims to assess the role of melanin, an established virulence factor in pathogenic microbes and fungi, on the susceptibility of *P. destructans* to volatile organic compounds. Melanin is a high molecular weight pigment produced by many bacteria and fungi. In fungi, melanin functions to protect against environmental stressors such as heat, radiation, and oxidative stress, attributing to the virulence of many pathogenic fungi. The increased virulence displayed by melanized fungi is concerning for WNS treatment development as this could severely limit the antifungal activity of any proposed treatment strategies. Therefore, understanding the impact of melanin production on proposed control methods, such as the use of volatile organic compounds, is essential for successful implementation in naïve and WNS affected bat populations.*

Physics

Simulations of Design and Function of Cosmic Ray Muon Detector for Muography

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Kenzi Waddell

Research Mentor(s): David Joffe

The purpose of this project is to construct an inexpensive and easily portable ionization-type detector built from a series of parallel plate capacitors filled with air (at standard temperature and pressure) and held at low voltage. The detector will be used for muography, an archeological technique that allows for the mapping of the inside of large solid structures or natural formations without disturbing them. This is accomplished by using a detector to determine the rate of cosmic-ray muon absorption of the object. A traditional muon detector, such as a cloud chamber or wire chamber, is difficult and expensive to develop and maintain in the field. They require high voltage (~2000V) and complex gas systems to maintain the correct ionization current. A simplified series of air-filled parallel-plate detectors would be more functional. Some low voltage versions of the parallel-plate detectors have been constructed, and without any signal amplification they can detect currents from micro-curie alpha and beta emitting sources. Amplification is being added to the detectors to achieve enough sensitivity to detect cosmic-ray muons. Simulations have been run in LT Spice to determine the best amplification circuit for the detector. GEANT 4 simulations have also been utilized to discover the energy range required to detect the most cosmic-ray muons. Additionally, a purely theoretical integral has been coded and solved using Fortran to discover the theoretical energy range. Using the improved amplification electronics and the findings from the preliminary simulations of detector use, the device is expected to function as designed.

Therapeutic Cerium Oxide Nanoparticles

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Angel Vasquez, Rebecca Anderson

Research Mentor(s): Kisa Ranasinghe

The overall goal of the research project is to create a glass that produces cerium oxide nanoparticles and as an efficient delivery mechanism. Cerium is able to exist as Ce^{3+} and Ce^{4+} because it has two partially filled subshells. This coexistence allows cerium oxide to have antioxidant properties that reduce the number of free radicals in that body that are associated with cancer, diabetes, and neurodegenerative diseases. In our laboratory, using a soluble borate glass, cerium oxide nanoparticles are created to coexist in Ce^{3+} and Ce^{4+} valences. This borate glass composition is doped with different amounts of Cerium(IV) Oxide and melted under different melting parameters to achieve different amounts of nanoparticles with Ce^{3+} and Ce^{4+} valences. The molten glass is poured on a steel plate and then powdered to achieve particle size ≤ 100 nm to extract the nanoparticles. The extracted nanoparticles are analyzed using high-resolution FEI Tecnai 30 TEM at Georgia Tech. The captured images of the extracted nanoparticles are observed using an ImageJ software to measure atomic distances and crystal sizes of these nanoparticles. The TEM analysis confirms the release of Ce^{3+} which is necessary to have with Ce^{4+} for both to act as an antioxidant. This allows for thorough investigation of what effects different melting times, raw materials, and heat of melting has on the cerium oxide nanoparticles.

Solid State Synthesis of Polar Magnetic Oxides

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Duy Pham, Christian Bucholz, and Taha Keen

Research Mentor(s): Chetan Dhital

Non-centrosymmetric polar oxides are subjects of considerable interest due to varieties of important phenomena and associated functional properties. Magnetoelectric multiferroic oxides are one such system where the magnetic properties can be controlled by electric field or the electric properties can be controlled by the magnetic field. This cross tunability magnetic and electrical properties makes multiferroic materials ideal candidates for making actuators, field sensors and memory devices. Simultaneous presence of broken inversion symmetry (electric polarization) and magnetism are two key requirements for multiferroicity. Non-centrosymmetric polar magnetic oxides simultaneously offer both (polarization and magnetization) properties. Therefore, we are working toward synthesis and investigation of non-centrosymmetric polar magnetic oxides of $RMWO_6$ (R = Rare earth, M = Cr, Fe) family.

Magnetic Properties of Polar Oxide $HoFeWO_6$

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Taha Keen and Duy Pham

Research Mentor(s): Chetan Dhital

In this work we analyzed the magnetic behavior of polar oxide HoFeWO₆ to understand the role of magnetism toward its multiferroic properties. Our analysis of magnetization versus temperature behavior indicates that there is paramagnetic to antiferromagnetic transition at $T_N \sim 18$ K along with a Curie-Weiss behavior in the paramagnetic regime. The magnetization versus magnetic field data below T_N , indicate a metamagnetic transition most probably caused by the sudden flip of Ho spins. We also estimated the change in magnetic entropy during the magnetic phase transition. This indicates there is relatively large change in magnetic entropy during the magnetic transition when compared to other similar oxides. Furthermore, we also analyzed the neutron diffraction data to obtain magnetic structure and magnetic order parameter. The plot of integrated intensity of magnetic peak versus the temperature (magnetic order parameter) follows closely to the magnetization vs temperature behavior.

Crystallizations of Nanoceria Extracted from a Soluble Borate Glass

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Rebecca Anderson

Research Mentor(s): Kisa Ranasinghe

Research in bioactive glass has not yet reached its full potential because there is little data on emerging applications. We are currently investigating a glass that can be used as both a carrier and a creator of therapeutic nanoceria. We have obtained proof that cerium can exist in both trivalent Ce³⁺ (Ce₂O₃ - reduced) and tetravalent Ce⁴⁺ (CeO₂-oxidized) states within the glass, with varying Ce³⁺/Ce⁴⁺ ratios, using X-Ray Absorption Near Edge Structure (XANES) spectroscopy. This coexistence of Ce⁴⁺ and Ce³⁺ ions facilitate redox reactions which mimic the action of two key antioxidant enzymes, providing numerous health benefits. In this study, a soluble borate glass composition was doped with various amounts of cerium oxide and processed with various melting parameters to create cerium oxide nanoparticles with varying ratios of Ce³⁺/Ce⁴⁺ embedded within the glass. These glass samples were then crushed down to obtain < 30µm size of glass powder, the soluble glass powders dissolved in DI water, and then centrifuged to extract the nanoparticles. Thermal characteristics of the extracted nanoceria were studied with un-doped borate glass as well as cerium doped glass powder using Differential Thermal Analysis (DTA). Doped and un-doped samples exhibited similar glass transitions. Doped glass samples and extracted nanoceria exhibited similar exothermic peaks that are not presented in un-doped samples, which indicate a possible crystallization of nanoceria.

College of the Arts

Art & Design

Animal Imagery in Carved Elephant Ivories from the Steckelmann Collection

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Alexis Lyons
Research Mentor(s): Jessica Stephenson

This research involves an analysis and discussion of select animal imagery featured on 27 carved elephant ivory tusk sculptures from the Steckelmann collection housed at the Cincinnati Art Museum. The carved ivories were commissioned by Carl Steckelmann, a German American trader from Indiana who had worked along the coast of equatorial and central Africa in the 1880s and 1890s. Steckelmann's collection of nearly 1,300 objects was acquired by the museum in 1890 and is the oldest collection of African art in a US art museum. To date the 27 ivory carvings collected by Steckelmann have not been extensively studied or published. The carved tusks show some form of the 19th century transatlantic slave trade and/or the emerging early colonial French and Belgian factory economy and the impact these practices had on the region the ivories came from, namely the Loango Coast. Scattered within the scenes of human labor, industry and violence are numerous images of various African animals. My research, a year-long project which I am conducting as a First Year Scholar in collaboration with my mentor, an art history professor, entails compiling an encyclopedic inventory of animal types represented within the collection, determining the most frequently depicted animals and then exploring their possible symbolism for the 19th century Africans artists versus what they may represent for the European or American patron.

One Furnace to Rule Them All

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Emily Keenan
Research Mentor(s): Page Burch

Efforts will be made to design, construct, and learn how to run an iron furnace safely and correctly. This is being done with the intention of competing at the SLOSS Furnaces National Landmark Student Cupola contest, that will occur during the Spring of 2021. The furnace will be adorned in elements, that draw inspiration, and evoke the imagery from J.R.R. Tolkien's Lord of the Rings trilogy. The inspiration behind Lord of the Rings will be researched. The research will address multiple facets of the Lord of the Rings realm, but it will focus heavily on the imagery of Sauron, his followers, and the architecture associated with his forces. During this process, the concept of sculptural and non-traditional furnaces will be explored. Metal furnaces are primarily constructed for function. They are viewed as a means to create a separate piece of art, but not as form of art themselves. The furnace will be constructed mainly through the welding of pieces of metal together, and using practices, such as laser cutting, to cut out patterns for the decorative details for the furnace. Upon the completion, the iron furnace will be fully constructed and have been run at least once, and ideally multiple times to ensure consistency before the competition. Through these iron pours, further knowledge will be obtained in the understanding of running a furnace, specifically an iron furnace, so that iron pours in the future can be conducted. In addition, the newly crafted furnace can be transported and run to cast molds for artwork or at any potential events and conferences that may be attended in the future. In conclusion, the semester should be finished with the knowledge and capability to run a furnace and safely direct a team without guidance of an instructor.

Using Art to Express Life Stories of Those with Disabilities

Not presenting.

Undergraduate Student(s): Emily Belinski

Research Mentor(s): Rick Garner

For many people struggling with disabilities, communicating their thoughts, feelings, or emotions can be quite difficult. Because of this, these individuals often have problems socializing and communicating with others. Although this obstacle makes it harder for individuals with disabilities to convey what they want to, programs, such as online websites and apps, provide these individuals with an outlet to express themselves. The purpose of this research is to gain knowledge about the usability of various art apps and websites that may enable people with disabilities to express their life stories and emotions. This allows for adequate apps to be found and tested before being used for the creation of digital stories, which is how those with disabilities will sufficiently express themselves and their experiences. In addition to allowing those with disabilities to articulate their past, the research will lead to an opportunity for individuals who cannot be accepted into a regular degree seeking university to have a college experience where they can even earn a certificate.

Dance

Examining Feedback Practices in the Dance Classroom

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Emily Pollack

Research Mentor(s): Caroline Clark

Dance teachers use feedback in the classroom as an essential tool towards student improvement in technique. Although research in the field of education establishes the need for feedback in the educational process (Baron, 1988), research in the field of dance education has not sufficiently addressed how students respond to different types of feedback through various styles of dance, as well as how important feedback practices are in the dance classroom specifically. Therefore, this cross-sectional study investigates how dance students respond to different types of feedback in technique class. To examine the relationship between feedback and perceived improvement, observations, interviews, and an online survey will be administered to students at the Kennesaw State University Department of Dance regarding learning styles, preferences, and background demographics. Experienced students with varying concentrations, ages, races, and gender identities relate to the personal effects of critique in technique class as they add unique perspectives of improvement. Participants will provide data about their experiences with current practices in dance technique classes, including verbal, visual, and kinesthetic components to further understand the gratifications feedback has on dance education. Analysis of the data will provide themes toward distinguishing how feedback operates in the dance classroom. Of particular interest are the following research questions: Is feedback necessary to practices in the dance classroom specifically? What medium of feedback creates the best response

between styles? Is there a preferred type through a variety of dance styles? The findings of this study could be used to provide instructors with the most effective ways to impart criticism and it can help define insightful ways a student can receive criticism.

Double Helix

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Katie Patrick

Research Mentor(s): Caroline Clark, Andrea Knowlton

The human body can be an exceptional vessel to interpret and express historical ideas through the art of dance. Rosalind Franklin is the scientist who captured the famous Photograph 51- the first photo taken that revealed DNA's three-dimensional structure - and made groundbreaking discoveries in the area of molecular biology. This piece will be a study of her life as she fought anti-Semitism during World War II, sexism in her field of study, and ovarian cancer that eventually led to her untimely passing; as well as a celebration of her discoveries on DNA, disease control, and her love for travel. The composure of this work was inspired by Franklin's lack of recognition; the three men she worked closely with won a Nobel Peace Prize for her work so that now she sits as a 'hidden figure' in history. Choreographic research was developed by studying time, space, and energy within the work and using these elements of dance to represent this subject. Time is discovered through the connectivity or disjointedness of the movement, the duration of a step or moment, and the literal abstraction of the era in which Franklin lived. Space is analyzed by the body's formation of the double helix shape, as well as stretching and contracting to show the fluxes in Franklin's life. The element of space also explores the scientist's love for nature and the spiraling or circular patterns of her research topics. Finally, energy is studied by the force of the movement, the intention or emotional expression of the work, and the contrast of freedom and boundedness just as Franklin experienced in her life. By combining the use of academic journals and embodied improvisational activities using the elements of dance, the final output will display the research as it is meaningful to the body.

Chasing the American Dream: Making the Nutcracker a Christmas Tradition in the United States

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Alexandra E. Walsh

Research Mentor(s): Caroline Clark

For many in the United States, The Nutcracker ballet is synonymous with the Christmas season, as it has secured prominence among annual Christmas traditions. Likewise, for many American ballet companies, The Nutcracker is both a fan-favorite and a financial success. Given the ballet's less than complimentary reception following its 1892 Russian premiere, it is remarkable that America has embraced it eagerly. This leads to the question, what transformed The Nutcracker from a mediocre ballet into a beloved holiday classic? Did American interest in The Nutcracker arise out of artistic appreciation, or were other sociological factors involved? Identification of the catalyst behind The Nutcracker's rise to fame in the United States requires a literature review investigating the historical,

political, cultural, and economic context of The Nutcracker's American debut. Existing dance scholarship takes an interdisciplinary approach to exploring the contextual history of The Nutcracker. Through cross-analysis of published scholarship, this presentation investigates the intricacy involved in making a ballet a tradition. Interestingly, one of the earliest introductions American audiences had to The Nutcracker was not as a ballet but as part of the Disney film, Fantasia. Some scholars suggest that Disney's whimsical cartoon choreography provided inspiration for the American Nutcrackers that would develop. Further analysis of the role of the arts and the nature of international relations during World War II suggests that American "high-art," including the ballet and classical music of the upper class, assumed new, perhaps patriotic, meaning within the home-front war effort. Additionally, as war influenced the American perspective, political and military alliances likely directed the course of popular culture. When considered in conjunction with history and politics, it seems that The Nutcracker ballet's American success is rooted more deeply in the realities of war, technology, and global relations than in the fantasies of sugar plums and dew drops.

Music

Broadening the Western Music Theory Canon

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Katie Kosowski and Brandon Portalatin

Research Mentor(s): Peter Fielding

Western Classical Music Theory of the Common Practice Period (~1650-1900) is centered around the repertoire of male composers that have been celebrated throughout the annals of Music Theory. The works of prominent male composers of the eighteenth and nineteenth centuries including W.A. Mozart (1756-1791), J.S. Bach (1685-1750), L. Beethoven (1770-1827), F. Schubert (1797-1828), and G. Verdi (1813-1901), would directly influence instruction and study of the stylistic periods. This fixation on such a small number of composers would serve as an instructional canon of examples of key concepts within undergraduate music theory spanning from the classical period to modern times, leaving little space to consider repertoire of women and BIPOC composers. Our research serves to broaden the Music Theory canon by identifying compositions from underrepresented groups of composers to expand repertoire used in undergraduate Music Theory and Aural Skills curriculum. This research explores a wide range of readily available music repertoire composed by women and BIPOC composers within the KSU library and online music databases such as The International Music Score Library Project (IMSLP). These resources have given an opportunity to explore and assess a wider range of compositions that align with undergraduate Aural Skills and Music Theory, giving the opportunity to advocate, foster, and promote a broadened spectrum of music theory repertoire. By including works from the composers identified in this research, students will be given the opportunity to broaden their exposure to a wider range of important and exciting music, thus expanding their repertoire for performance and personal enjoyment. Through sharing this rich diversity of repertoire, this research serves to expose music students and audiences alike to a fuller and more diverse range of composers within the Common Practice Period to help classical music shed its perceived image as an "elite" art form.

Theatre & Performance Studies

Fashion as Freedom: The Bustle and Women of the Late Victorian Era

Presentation - [Join now.](#)

12:20pm –12:35pm

Undergraduate Student(s): Sydney Everett

Research Mentor(s): Thomas Fish

*The paper examines the relationship between late nineteenth century women, their freedom, and their undergarments, specifically during the bustle period between 1867 and 1889. There is a general bias in the U.S. public against Victorian fashion. The bustle, a wire, cage-like undergarment constructed to create a dramatic bump extending the rear, is often considered ridiculous, impractical, and dangerous due to the exaggerated proportions and seemingly endless layers. However, we develop these thoughts by looking at the past through the lens of modern ideals. My research investigates the Victorian woman's relationship to this seemingly restrictive fashion trend and details the surprising levels of freedom uncovered because of the bustle. These undergarments, I will argue, increased mobility, allowed women to participate in athletics, and even had an economic benefit through a vital industry that developed around bustle-smuggling. Methodologically, I consider late 19th century primary sources, including articles from *The New York Times*, *Godey's Lady's Book*, and *Harper's Bazaar*. These fashion trends are then contextualized with contemporary scholarship on Victorian fashion, such as "Smuggled in the Bustle" (Hind Abdul-Jabbar) and "Changing Ideals of Womanhood During the Nineteenth-Century Woman Movement" (Susan M. Cruca). The project will interest fashion historians and theatre practitioners alike; it provides costume designers ideas on how to marry actor comfort and historical accuracy, and for theatre practitioners, a way to analyze the inner life of female characters like Hedda Gabler in Social Realist plays from the period.*

Goddesses' Breaking Waves

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Meggan Collins and Haley Cain

Research Mentor(s): Thomas Fish

*Everyone knows about Greek mythology, especially the famous gods referenced in *The Odyssey*, but have they taken the time to try and connect these beings to a personal experience? Many people can recognize Homer's story, because at some point in life, nearly every student has read and experienced it on some level. In a two-part piece opening with visuals and moving into a poetic performance, we focus on Calypso and Athenas insight on a lack of love from men. We zoom into the scene where Odysseus has just left Calypso's island and gone into the clutches of berserk Poseidon where Athena must find a way to keep her uncle at bay no matter what. We took this ancient story and connected its characters to a contemporary context by creating threads between mythical characters and their essence, to modern-day human experiences. *Goddesses Breaking Waves* is a feminist piece that deals with the themes of desperation, freedom, and finding self-worth. We dive into how contemporary young girls can borrow strength from brilliant goddesses to triumph over men who hold them back!*

Exploring Queer Theory in “The Balcony”

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Brooklyn Norrington

Research Mentor(s): Thomas Fish

Jean Genet, in his play The Balcony, has constructed a link between sex and power, harboring a relationship of sexual exploration and internal authority. The play challenges illusion, innate and acquired status, and sexuality, with the dominant explanation being that theatricality and queer theory is the inception. As I delve into underlying subjects and fine detail ingrained into the play, queer theory will evidently become centralized. Production elements that I plan to encompass within a mock production of this play, will reinforce Genet’s idea of sexuality and power. Through my personal reading of both the play, examining interviews of the playwright, and researching analyses on “The Balcony”, my presentation will interpret how theatrical and production elements of lighting, set design, and costume, accentuate the thematic concepts of queer theory. Using my research and observations, I will not only demonstrate the association between attained authority and sex, but I will encourage others to explore that relationship among themselves.

You Were Born in the Middle of a Pandemic

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Caryn Bowles

Research Mentor(s): Thomas Fish

In the era of COVID-19, the whole world has had to change what ‘normal’ days look like for communities. Specifically in the U.S., there have been seismic shifts in the way families operate, the way mothers connect, and the way women have relationships with others and self. My monologue details the unique experience of moving through pregnancy and motherhood in a time of seeing only eyes and people living in immense fear. I am a mother and I speak to the generation being born to mothers right now. These babies will experience all of these major shifts as their normal experience and so I want to leave a piece of that out in the world with my words. Mothers are trying to help their new babies ‘cope’ with this new life and yet, they are not coping. They are existing. Moms are coping. Motherhood is changing. I place some personal historical reference around what it was like to have a baby in the middle of a pandemic. I shed light on the experience through a monologue that is looking out of the eyes of a mother who was blindsided by the world while pregnant with her daughter. I give voice to the intimate moments and share the history that was written as it happened so that these “covid babies” have a glimpse of how we experienced the birth of this new generation.

Princesses Have a Choice Too: A Look into Female Autonomy in Theatre for Young Audiences

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Ra'Mya Aikens

Research Mentor(s): Thomas Fish

As the doors are finally beginning to open back up to the theatre world, people will be met with productions such as Kennesaw State University's TYA (Theatre for Young Audiences) show, Thumbelina. Thumbelina is a popular fairy tale written by the Danish author Hans Christian Andersen. Kennesaw's production of the show, however, has been reimagined by students and faculty here at the university to modify previous versions that portray Thumbelina as a passive character who's only hope is to be saved by a loving prince. With the young and impressionable audience members in mind, the production serves to highlight characteristics of the bravery and autonomy present in young women. One of the pieces in the play that encompass these ideals is the finale of the show, "I Look Like You", which I wrote with these ideals in mind. In my research project, I will be sharing recorded samples from the production and the finale, I will highlight the creative process that went into the making of this piece, and I will also analyze its thematic and psychological importance to the impressionable minds of the young children who will be in attendance of the musical.

Radow College of Humanities and Social Sciences

Communication and Media

Trauma in the Media: A Thematic Analysis of Trauma Representations in The Umbrella Academy

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Macy Dykes

Research Mentor(s): Lindsey Hand

The purpose of this study was to examine how trauma and the effects it has on mental health are represented in the media. The existing literature in this area of study has primarily focused on the lack of response representation present in portrayals of trauma. This has left a lack of available research examining examples where trauma response is actually addressed. This study seeks to fill that knowledge gap by examining a piece of media in which trauma and its effects are integral to the story and main cast of characters. A thematic analysis was conducted of the first season of the popular Netflix series The Umbrella Academy which resulted in the identification of six central themes regarding trauma and trauma response- 1) experiencing trauma and abuse, 2) flashbacks, hallucinations, and nightmares, 3) aggressive and reckless behavior, 4) substance abuse, 5) difficulty forming and maintaining relationships, and 6) negative mood and self-image. Instances of each theme's appearance in the show were noted and subsequently coded by which of the six main characters were involved in the example. This study analyzes how the show used elements of trauma response in plot and character development over the course of a 10-episode narrative and argues that The Umbrella Academy stands out amongst other shows in its genre as an example of accurate trauma representation. The results of the analysis found that the show utilizes its large and diverse main cast to represent a spectrum of trauma effects by presenting varying degrees of each theme in the individual characters' storylines. All

six characters experience the effects of their trauma differently, which results in a well-rounded overall portrayal of trauma effects on the show as a whole.

Reporting on the Newsroom

Not presenting.

Undergraduate Student(s): Lauren Nye

Research Mentor(s): Lindsey Hand

The HBO television show, The Newsroom, created by Aaron Sorkin, is the focus of this study, specifically digging deeper into how the show portrays journalists and the journalism industry. The purpose of this study is to establish whether or not The Newsroom portrays the journalism industry accurately, and this study prompts further thought on how the television show impacts society's view on journalism. The media portrayal of journalism may be a contributing factor to why society is becoming more skeptical of news media, and the content covered in The Newsroom may contribute to this skepticism. In conducting a thematic analysis of the first episode in season one of The Newsroom, five themes were identified. Those themes are as follows: 1) journalists believe that Americans and American news are missing a sense of integrity, 2) journalists are faced with life and death scenarios, 3) journalism is an honorable profession, 4) journalists are manipulative, and 5) trust is a fundamental to journalism. The identified themes within the script insinuate that journalism is an honorable art form that has been lost and that modern-day journalists should reclaim the integrity of their careers. Critics' responses to The Newsroom show that modern-day journalists have a love-hate relationship with the television show, proving that The Newsroom is not the most flattering in its portrayal of journalism. It may benefit future studies to go beyond how The Newsroom portrays journalism; future studies should focus on the specifics of how audiences are interpreting The Newsroom and how it may impact one's perception of their own favorite nightly news anchor. It may also be of benefit for future studies to examine multiple media portrayals of journalism. This study may help one to better understand the influence Hollywood has on society.

Joking, Juries, and Jurisprudence: Informal Communication in a Formal Workplace Setting

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Mireya L. Garcia-Cortez

Research Mentor(s): Robin Mathis

Humor is everywhere, and that is no exception in a work environment. Humor is a way for humans to cope with stress, anxiety, and sadness in a job. Those with a courtroom profession tend to use dark humor to cope with some of the situations they experience in their jobs. Dark humor is used to make sense of what occurs in the courtroom as courtroom personnel must deal with atrocities at times. This research should find that dark humor is common among courtroom personnel due to the events experienced in a courtroom setting. In addition, those who have a long time working in courtroom settings use more dark humor than those who have a shorter time working there. This research goes in-depth on dark humor in a courtroom setting compared to regular humor. This research will also allow a

better understanding of how courtroom personnel interact with others. The future of this research is to find out how people around courtroom personnel view their humor.

How Has Social Media Use Impacted Anxiety and Loneliness During the COVID-19 Pandemic?

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Lauren Deaver

Research Mentor(s): Emily Scheinfeld

During the COVID-19 quarantine, many people turned to social media to stay connected. There have been many discussions about the impact of frequent social media use on mental health (Baltaci 2019. The Predictive Relationships between the Social Media Addiction and Social Anxiety, Loneliness, and Happiness). With the increased reliance on social media in recent years, and due to increased social isolation during the pandemic, this project aimed to investigate the impact of social media on people's anxiety and loneliness levels, and how they related to age and the purpose of social media use. It was hypothesized that older people would be more likely to use social media for informational and social purposes, specifically connecting with friends and family, resulting in higher anxiety and lower loneliness levels. It was also hypothesized that younger people would be more likely to use social media for entertainment purposes, resulting in lower anxiety and higher loneliness levels. An online survey was taken by 459 participants recruited through social media platforms and via MTurk. The survey collected information including participants' age, most common uses for social media, social media platforms, as well as mental health measures including anxiety and loneliness. The results of this survey indicated that age did not have a significant impact on how people used social media. However, people who used social media for mostly informational purposes (e.g., news and health information seeking) generally reported higher levels of anxiety. Alternatively, people who used social media mostly for connecting with friends and family generally reported lower levels of anxiety and loneliness. There was no significant relationship between using social media for entertainment and anxiety or loneliness levels. This information can be used to better understand the broader impacts of social media use on mental health.

English

Women Genre Writers in Television and Film

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Gabrielle Jones

Research Mentor(s): Anna Weinstein

Screenwriters are the backbone of the film industry; without them a good movie never becomes great. However, when screenwriters are referenced names such as Eric Roth, Billy Wilder, and Robert Town are the ones receiving notoriety while female writers slip through the cracks. Yet, female screenwriters have been a part of history since the early 1920's with writers such as Francis Marion and Dorothy Parker who wrote pieces about women and family issues seen during these times. Recently, female

*directors have begun to receive more recognition for their work, but female screenwriters are still rarely referenced for there's. I will be highlighting three female writers who have written prominent films focusing on high conflict and the fragility of their characters. I will be starting with Sonya Levien who is known for her thriller *Four Men and a Prayer* (1938) which focuses on a white male protagonist, then Lynne Ramsey who is most well-known for *We Need to Talk About Kevin* (2011) in which she focuses on a white female mother who is the main protagonist of the film, and finally Dee Rees who is known for *Pariah* (2011) which focuses on a lesbian, African American, female protagonist. Not only will I speak about these screenwriters, but I will also speak about how the representation of the main protagonists in stories have changed throughout the centuries.*

Did Ishmael Know the Raven? Publisher Evert Duyckinck and the Connection Between Edgar Allan Poe and Herman Melville

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Danny Wilson

Research Mentor(s): Tamara Livingston

Although Poe was a social introvert, he knew and was connected to other early American Romantic writers, including Herman Melville. Examining first editions of works by both authors in the Bentley Rare Book Museum at Kennesaw State University, I discovered a common link between them – the publisher and literary critic Evert Duyckinck. In this presentation, I will use evidence from the first editions and the Poe & Melville Archives at the New York Public Library to investigate the nature of the relationship between Poe, Duyckinck and Melville. I found that Duyckinck was Melville's close friend, however, he was Poe's critic and was extremely harsh on him. First editions can tell us a great deal about the circumstances of publication and are an important resource for scholarship.

Top Ten Literary Myths

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Jackson Call

Research Mentor(s): Brian Artese

Tube O' Theory is an educational YouTube channel dealing with literary criticism and theory. It presents formal arguments and educational information in a way that is much more accessible than text. The goal of this content is to make literary criticism and education more interesting and engaging to viewers. The video that we are currently working on for the channel is a less formal piece titled "Top 10 Literary Myths." This video is less in-depth than many of the other videos on the channel, but its goal is to be able to reach a wider audience. The video uses comedic effect to engage viewers and covers many contentious issues among literary critics and enthusiasts. "Top 10 Literary Myths" is more of an opinion piece, and anyone with a passing interest in literature should be able to engage with and enjoy the video without having too much background knowledge.

Internships and the Job Market: How Remote Work Affects College Student's Careers

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Francisco Orozco

Research Mentor(s): Lara Smith-Sitton

In 2019, a leading online comparison resource called Compare Camp reported that 56.1% of college students that completed an internship were able to find entry-level, full-time employment. However, the Covid-19 pandemic has added a new variable to the equation the employment of college students and for college interns—the structure of the “workplace” has changed and will likely keep changing. According to a study done by Owl Labs, 70% of full-time employees are working from home using a remote work platform and 80% of these employees expect to work from home after 2020 at least three times a week. This presentation will explore how increased use of remote work platforms has affected internships and career opportunities among college students in 2020. Through an IRB-approved research project that uses surveys and interviews, this work will affirm the idea that internships are one of the best ways to develop job skills and career-readiness and provide an authentic work-based learning experience for college students. The data collection considers two main questions: (1) What do established sources prior to the Covid-19 pandemic reveal about the impact of internships on college students’ professional lives? (2) During the pandemic and after, how have and will internships and career opportunities change because of remote work, and what skills do students need to develop to respond to changing work environments? With this information, college students, faculty, and employers can appropriately prepare for workplace changes and hiring needs in the current and post-pandemic worlds.

Foreign Languages

Measuring German Vocabulary Learning

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Katrina Clark

Research Mentor(s): Shane Peterson

Vocabulary is an important part of learning any foreign language. But not all words affect our ability to communicate and understand equally since some words are used more often than others. In the case of German, research indicates that learning the 1,000 most frequently used word families helps learners understand approximately 70-75% of written texts and up to 90% of spoken language. In this study, we compare the writing abilities of two groups of beginning German learners, one using a traditional textbook and the other using a curriculum based in word frequency studies. Using NVivo software, we compare the breadth and depth of the two groups’ active vocabularies. In this presentation, we will present our preliminary findings on the effectiveness of a vocabulary frequency approach.

Geography & Anthropology

How Do the Gender and Race/Ethnicity of Healthcare Providers Impact Quality of Care and Health Disparities?

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Maygui Jean

Research Mentor(s): Evelina Sterling

Overwhelming evidence from previous studies shows that racial and ethnic minorities experience worse health outcomes and poorer quality of care compared to white Americans, even when factors such as income, education, and insurance are controlled. Many factors contribute to health disparities, including the influence of the health system, as well as bias, stereotyping, and clinical uncertainty on the part of healthcare providers. As a result, recent interest has been directed to better understanding if patient-provider gender and race-concordance may lead to improved health outcomes for minority patients. This particular study is part of a much larger study focusing on low-income African American men with multiple chronic conditions who also tend to suffer from disproportionate rates of morbidity and mortality related to their illnesses. This health inequity is often further exasperated by social factors related to discrimination and systemic racism. A mixed method approach will be utilized to gather qualitative (interview) and quantitative (survey and medical records) data from both low-income African American men with multiple chronic conditions and their healthcare providers. Data will be analyzed to assess knowledge, attitudes, and behaviors around healthcare quality differences experienced by low-income African American men with multiple chronic conditions as expressed by healthcare providers of different genders and races/ethnicities. Moreover, we will also investigate patients' preference, satisfaction and communication pertaining to healthcare providers' gender, race and ethnicity, including people who look like them or share similar language or culture. Overall, we aim to improve our understanding of if, why and how patient-provider gender and race-concordance influence minority patients' experiences, the healthcare process, and outcomes.

A Story about Chickens

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Adrienne Pinkard

Research Mentor(s): Uli Ingram

This project analyzed the last few decades of production and consumption of chicken eggs and broilers. The first documented chicken from 8000 years ago was the Red Junglefowl. Throughout history chickens were not consumed but used for fighting and religious symbology. It wasn't until the 1990s when consuming chicken surpassed beef (80 pounds per capita), thanks to favorable climate in the south for raising chickens and the fortification of chicken feed that allowed factory farms to raise chickens indoor. I consider raising chickens in your backyard as sustainable since they provide year-round fresh eggs, are low maintenance, provide free garden fertilizer, and allows you more control where your chicken egg and meat come from. More counties are starting to loosen their ordinance restrictions for homeowners raising chickens in their backyard, which proves to be more beneficial to the environment

than the trip to the grocery store. I hope this will shed a different light about chickens outside factory farming and that you consider getting a couple of chickens to raise in a small corner of your backyard.

Indus Civilization Archaeology Research

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Jarred Benjamin

Research Mentor(s): Teresa Raczek

Good data is not hard to find in archaeological research, but previously published data is scattered to any number of websites, books, and academic journals that must be exhaustively searched to find all necessary data. The goal of this research is to compile, evaluate, and recalibrate radiocarbon dates from archaeological sites in South Asia. The research is to find as much useful data as possible and enter it into an easy to parse dataset to speed up research. The data being used is dates reported in archaeology site reports of materials excavated and carbon dated to find their age. By searching through as many online and physical resources to find site reports that have archaeology dates about various archaeological sites, the research team hopes to find and unite usable radiocarbon date into a single dataset. This research also calibrates samples with the Intcal20 software system and using radiocarbon calibration curve to find their dates. Multiple sites from the Indus Civilization in Pakistan and India are included with many dates updated to reflect their time periods. Eventually this dataset can be a cornerstone of archaeological research about South Asia.

The Correlation between Urban Sprawl and Air Pollution: How Seattle and Orlando Combat Urban Sprawl's Negative Effects

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Kylie Anderson

Research Mentor(s): Paul McDaniel

Urban sprawl is a growing phenomenon around the world. If this expansion is too rapid, perhaps without proper city planning, there can be downsides to urban sprawl. It is typically characterized by low-density, separated land-uses, inefficient use of energy, and a dependence on cars. Oftentimes, residents require a car for even a quick trip to the nearest grocery store or post office. Any person, company, or service (such as workers, shoppers, mail carriers, garbage pick-up, deliveries) that needs to travel between different areas must travel unnecessarily long distances and use larger amounts of fuel to do so. For this project, the objective is to analyze the effects of urban sprawl on air quality and to explore the solutions and policies that have been used to control and/or prevent its negative effects. A qualitative methodology will be used, including a search of the scholarly literature about the effects of urban sprawl on air quality and greenhouse gas pollution. Primary documents will be collected, such as reports and plans from metropolitan planning organizations (MPOs), and content analysis will be performed to explore the policies planners have implemented to combat these problems to compare and contrast strategies to mitigate urban sprawl. These strategies will then be assessed in two distinct case study metropolitan statistical areas (MSAs): Seattle-Tacoma, Washington and Orlando, Florida. Based

on the reviewed scholarly literature and each metropolitan area's plans and policies, suggestions will be made for effective mitigation of sprawl's negative effects on air pollution.

The Stamp of the Swift Creek Culture: An Analysis of Middle Woodland Pottery at the Traversant Site in Georgia

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Juliana Damico

Research Mentor(s): Terry Powis

The Woodland period (1000 BC – AD 1000) in the Southeastern US is characterized by sedentary horticulturalists living in villages located along major rivers. The Middle Woodland subperiod (300 BC – AD 600) is further defined by the appearance of distinctively decorated pottery. Specifically, Swift Creek pottery (ca. AD 100- 600/850) is known for its elaborate curvilinear designs that were stamped onto pre-fired vessels using carved wooden paddles. The pottery is said to be unique in that no two designs were exactly the same. It has been argued that this pottery was traded exclusively among elites at larger Swift Creek sites as Kolomoki (AD 350-750) located in South Georgia. The purpose of this project is to challenge this model of exclusive trade by identifying Swift Creek pottery at smaller sites. The Traversant site, a small village situated on Flat Shoal Creek in Pine Mountain, Georgia, with a distance of 198 kms (123 mi) from Kolomoki, has shown to hold an abundance of Middle Woodland sherds. But, has Traversant produced any Swift Creek pottery? By using Snowvision, an advanced software program developed specifically for pattern matching ceramic artifacts from Swift Creek sites, it becomes evident that this pottery type existed at Traversant, albeit in small quantities. Its presence is important for many reasons but the main one being it revolves around the nature and extent of the sociopolitical and economic relationships that existed between large and small sites that may have been trading and exchanging Swift Creek pottery.

Domestic Migration in The United States: A Study of Patterns within Place and Space

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Joshua Kanger

Research Mentor(s): Paul McDaniel

The purpose of this research is to identify specific routes and trends of domestic migration in the United States. Secondary quantitative data analysis in conjunction with the United States Census Bureau information is used to analyze domestic migration patterns between two metropolitan regions: Atlanta, Georgia and Chicago, Illinois. All counties of the surrounding metropolitan statistical areas (MSAs) are compared to measure potential push and pull factors that stimulate migration between these geographical areas. Analysis of census data and net migration patterns reveal trends between these two urban regions. Examining domestic net migration between these two metropolitans gives examples into internal migration patterns. Though domestic relocation has dwindled in recent years, the United States still nonetheless has some of the largest percentages of domestic resettlement. Examining specific counties of both the Atlanta, Georgia as well as the Chicago, Illinois metropolitan regions, data for

each individual county illustrates patterns of migration between the years of 2014-2018. Examining patterns of domestic migration trends may ultimately help reveal and determine causes of why people choose to relocate. Observing statistics from the available data, patterns, trends, or even revelations about changes occurring in our society can be found by exploring trends among census data regarding domestic migration.

Understanding Early 20th Century Tenant Farming in Bartow County, Georgia

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Joshua Reed

Research Mentor(s): Terry Powis

Tenant farming is an agricultural system in which farmers cultivate crops or raise livestock on rented land. Tenant farming became prominent directly following the American Civil war due to the bad economy former slaves and poor whites faced. Tenant farmers oftentimes owned equipment and supplies and were provided with food and other necessities from the landowners. The Adams family house is a historic building situated in Cartersville, Georgia located only a few miles northwest of the Etowah Indian Mounds. The house was constructed on the Walnut Grove Plantation, owned by the Young family since the early 1830s. Abandoned for a century or more, my research focuses on rediscovering what we know about the daily life of the Adams family through archaeological investigation, archival study, and oral history. Archaeological investigation was centered on clearing the vegetation as well as mapping the extant building to reveal architectural and construction information. Artifacts excavated from in and around the house help to round out what we know about their socioeconomic status. Archival study and oral history were more limited in scope and scale, but the information retrieved complemented the archaeological field and lab work. Combined, the research presents a picture of an early 20th century tenet farming family, hidden from view until now. Exposing this lifestyle adds to our understanding of the mode of production of this specific family in relation to the typical tenant farmer standard at the time.

KSU Mapping Project

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Bailey Walton

Research Mentor(s): Uli Ingram

Kennesaw State University was founded in 1963 and officially started having on-campus classes on January 9th, 1967. Over the past 80 years, KSU has expanded to include more than 65 buildings between the Kennesaw and Marietta campuses. However, the additions of these buildings have been poorly documented and are not easily accessible. This research project has been conducted to provide access to the information of Kennesaw State's campus history. Over the past 6 months I have worked excessively, attempting to track down the dates of completion for every building on campus. With the assistance of Dr. Uli Ingram and the KSU archives, I have been able to document the building dates for

most of the structures on campus. I hope this data will inspire others, like it has me, and provide students an easily accessible document accompanied by a visual timeline of the buildings being added.

Home Sweet Home: An Architectural Analysis of Houses During the Middle Mississippian Period in the Etowah River Valley

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Jordan Farkas

Research Mentor(s): Terry Powis

The Mississippian period lasted from AD 1000 to AD 1550. It is divided into three different subperiods, Early (AD 1100-1200), Middle (AD 1200-1375), and Late (AD 1375-1550). Mississippian life, in general, is characterized by a ranked society, large villages located on floodplains near major rivers, a subsistence base centered on maize agriculture, as well as the use of triangular-shaped projectile points in hunting and new forms and decorative motifs on pottery for cooking and storage. One of the biggest developments in the Mississippian period revolves around house architecture and construction practices. After AD 1200, house design shifts away from rectangular shapes, wall trench construction, and bent pole roofing to square structures with rounded corners, single-set post walls, interior supports, and gabled roofs. My research focuses on these changes in houses during the Middle Mississippian period and how they compare and contrast with those found at both large and small sites. It focuses not only on how they were constructed, but also where they are constructed, perceived differences in summer and winter houses, and what features were found in and around them. My study will examine a single house that has been recently excavated at the small village known as the Cummings site to those houses found at Etowah. Etowah is a large regional center located only three kilometers (or two miles) to the southeast of Cummings. Both sites have a well-documented Middle Mississippian component which will allow for a fine-grained analysis of house types situated within the Etowah River Valley.

10 Miles from a Brewery: Spatial Patterns of Demographics and Alcohol Consumption in the United States

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Winston Chu

Research Mentor(s): Nancy Hoalst Pullen and Mark Patterson

What are the demographics and beer consumption patterns surrounding breweries in the United States? Using 10-mile drive-distance buffers, the demographics and beer consumption patterns were identified for each of the 8,579 breweries in the United States (as of January, 2021). ArcGIS Online and ArcPro mapping platforms were used to create the brewery geocodes to be later encompassed by the 10-mile drive distances buffers, which were then enriched with 59 variables relating to demographics and beer-related consumption data. These data were ascribed to seven US regions as noted by the Beer Judge Certification Program (BJCP). Results show unique regional trends in spatial patterns in total population, population by age and gender, median household income, and beer consumption, among others.

Detecting Bacterial Species from Ancient Human Skeletal Samples

Not presenting

Undergraduate Student(s): Ariel Owens and Daisy McGrath

Research Mentor(s): Tsai-Tien Tseng

This paleopathological study aims to identify Mycobacterium tuberculosis complex (MTBC), Mycobacterium avium complex (MAC) and other Mycobacterium species in silico from skeletal samples that belonged to 28 Polish individuals in the Neolithic period under PRJNA422903 from the Sequence Read Archive (SRA). After next-generation sequencing (NGS), bioinformatics methods are heavily relied upon for identification of pathogens from complex samples. We implemented a bioinformatics pipeline, with custom-built databases, utilizing the following software tools: Trim Galore! and Kraken2. After adapter trimming, Kraken2 was used for taxonomic classifications. We have found that Mycobacterium is present in all 28 individuals. The average percentage of MAC present in the genus Mycobacterium, in all 28 individuals, is 6%. Reads from MTBC makes up an average of 7% of the Mycobacterium genus. We have identified previously unreported strains of MTBC and MAC such as Mycobacterium tuberculosis XDR1219, which is an extensively drug-resistance strain. Our analysis also revealed 14.8% of reads from MTBC belong to Mycobacterium avium hominissuis, which was commonly found in humans and pigs. Additionally, strains of Mycobacterium simiae complex were also discovered. Mycobacterium simiae has been commonly found among immunocompromised individuals. In conclusion, our bioinformatics pipeline has been more effective than other published approaches. This approach broadens the potential scope of paleoepidemiology both to older, sub-optimally preserved samples and to pathogens with difficult intrageneric taxonomy. It is therefore suitable for other studies in paleopathology using NGS technologies.

Ironing out the Data: A Review of Chronometric Hygiene for Iron Age Sites in Southern India

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Kady Yeomans

Research Mentor(s): Teresa Raczek

In southern India the Iron Age is usually dated to about 1500-200 BC using carbon-14 dating. However, since the early advent of C14 dating in the late 1940s, our knowledge of how carbon decays over time has changed thanks to advancements in science. Some of the earlier archaeological dates have the potential to be less useful than others due to older collection practices and processing methods. This paper presents results from a chronometric hygiene process that was applied to the current data. Chronometric hygiene is vital to continually assess the viability and accuracy of C14 dates. Dates that cannot be verified as scientifically sound have been culled from the data set and the valid data has been updated using the new IntCal20 radiocarbon curve for assessing accurate dates. The work has the potential to change generally accepted dates for time periods in southern India and open the flood gates to new discovery and knowledge of the region. This work will also go hand in hand with all of the recent work being done on the Iron Age in southern India and has the potential to be an excellent point of reference.

Stories and Voices: Continuing the Conversation of Native American Authors through Curating an Exhibit.

Not Presenting.

Undergraduate Student(s): Morgan Bendzinski

Research Mentor(s): JoyEllen Williams

Archives and special collections function to provide research material and to preserve it for future generations. In more recent years, archives, special collections, and other disciplines are evolving to become more diverse in topics and represent communities that have been previously ignored. Using historic and modern literature, I created an exhibit to bring awareness to the ongoing conversation about Native American history and cultures. This includes exhibit panels in addition to material from the Bentley Rare book museum, which educates young adults about the background of the Trail of Tears and highlights Indigenous voices. Historic voices such as Elias Boudinot from the Cherokee Phoenix and modern voices such as Joy Harjo the current US (United States) Poet Laureate. As an Anthropology student at KSU, Anthropology, Archives and Native American Studies have the opportunity to collaborate and bring students from multiple disciplines together. Collaboration between the departments can bring in multiple perspectives that impact how and what we learn about Indigenous people's culture and history.

History & Philosophy

Agent Eve: A Look into Women in Espionage

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Léla Calixte

Research Mentor(s): Tyler Crafton-Karnes

Known as the eyes of the Pharaoh by the ancient Egyptians, the ancient craft of espionage was historically a job held by male civil servants. Nevertheless, I wanted to focus on the women who paved the way for others in secret intelligence and selected individuals from differing backgrounds and political allegiances in a project to curate a learning module suitable for K-12 and university students. During my research period at the Museum of the Holocaust and History Education and Kennesaw State University, I was drawn to two women's stories: Josephine Baker, an African American performer who was a spy for the Allied powers, and Stella Goldschlag, an Axis spy and Gestapo collaborator. In my research, I used articles and primary source documents from archives in the United Kingdom and New York and created an interactive slideshow with activities. The process of creating a succinct, interesting learning module was both challenging and rewarding. Through my work, I was able to understand further the power and effect these women had on the war and the male-dominated art that is espionage.

Literary Genres as Civil Rights Catalysts

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Sydni Zackery

Research Mentor(s): Tamara Livingston

When one thinks of the Civil Rights Movement, they think about protests, sit-ins and boycotts. Although physical protests were important, I argue that published literary genres such as sermons, short stories and poetry were critically important in broadening awareness of the Civil Rights Movement. It is known that even during the times of slavery African Americans used a form of writing, known as protest writing, to fight for the abolishment of slavery up to what is generalized as the Civil Rights era. In this project I will compare first editions of three historic publications by African Americans [1746-1963] to show the importance and effect of different literary genres in the struggle for the civil rights. In my analysis of the selected works by Langston Hughes, Arna Bontemps and the Reverend Martin Luther King Jr. I consider how these publications served as an expressive outlet for the writers and a platform for protest. I will also consider what these first editions can tell us about how these authors were published and for whom the works were intended. Finally, I discuss how first editions can serve as primary sources for a better understanding of the Civil Rights Movement.

Political Science & International Affairs

Comparative Education Understanding Why the United States Underperforms in International Test Scores: Learning from China, Japan, Canada, and the United Kingdom

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Mama Aye-Addo

Research Mentor(s): Charity Butcher

The United States has slowly but surely fallen in their standing in global education. Education affects everything from economic standing to innovation for the future and thus the decline in educational standing presents a problem for the U.S. This research uses the Organization for Economic Co-Operation and Development's Programme for International Student Assessment as a baseline for where countries place relative to the United States. The study then uses Canada and England to represent nations with ideologies and economies most similar to the United States as well as China and Japan to represent countries that differ. Each nation's governmental structure, societal issues, and economies are compared in order to understand how the individual systems affect overall education policy. The overall findings of each nation are taken and compared to that of the United States and policy suggestions are drawn based on the history and educational structures in the U.S. The policy that is offered is intended to take in account what limitations and variances that the United States has and offer the best solutions, while also taking into account what has been successful in other nations.

Psychology

Examining Student Well-Being: The Development and Initial Validation of the Psychological Vulnerability and Hardiness Scale

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Kimberly D. Gomes

Research Mentor(s): Brian A. Moore

Background: Stress is a significant concern for undergraduate students, with some experiencing clinical levels of distress. Psychological vulnerability and hardiness are constructs that evaluate an individual's sensitivity to stressors and protective factors related to maladaptive responses to distress. However, no measure has been developed to assess their combined effect. Method: The present study examined the factor structure and correlates of the Psychological Vulnerability and Hardiness Scale (PVHS) in two samples (i.e., traditional university students and student veterans). Items were created through focus groups with occupational therapists who have experience assessing both constructs in university students. Factor structure and model fit was evaluated using statistical analyses (i.e., confirmatory factor analysis), while convergent and divergent validity were assessed with five established measures. Results: The PVHS exhibited strong internal consistency and factor loadings, which demonstrated its psychometric reliability. The hardiness subscale exhibited strong negative correlations with state and trait anxiety, depression, and psychosocial functioning, and strong positive correlations with measures of hardiness and resilience. The psychological vulnerability subscale demonstrated strong positive correlations with psychosocial functioning, anxiety, and depression, and negative correlations with hardiness and resilience. Conclusion: The PVHS is a valid, parsimonious measure of hardiness and psychological vulnerability. The PVHS may contribute to the understanding of the relationship between stress and well-being and have clinical utility for college or university counseling centers to help promote student well-being. Future studies should utilize longitudinal designs with a diverse age population to understand how psychological hardiness and vulnerability are expressed during stressful situations.

Rural and Urban Influence on Intragroup Microaggressions of Southeastern Filipino-Americans

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Gabriella Ramos

Research Mentor(s): Anisah Bagasra

After considerable assessment, research has identified the significance of intragroup prejudice through the form of microaggressions. Microaggressions, in terms of intergroup dynamics, are a relatively new phenomenon, but literature on intragroup dynamics is arising alongside with it and provides a different relational perspective. By factoring in a multitude of variables, literature has suggested that the concept of intragroup microaggressions is a multidimensional behavior that varies amongst different Asian groups. By focusing even more so on the micro-level of ethnicity, most literature on the topic is based on model minority Asians in the United States' West, Midwest, or Northeastern areas. That being said, this proposal offers insight to the nuances of Filipino-Americans in the Southeast. The main themes of this paper focus on the overall behavior of Filipino-American microaggressions as well as any urban or

rural influence from current and childhood locations. Because there is little research on the intricacies of intraethnic microaggressions in Filipino-American culture, this paper focuses on that intragroup dynamic and urban-rural dichotomy. Based on the data, Filipino-Americans perceive that their experience with microaggressions is worse with people of other ethnicities rather than in their own culture. This research concludes with a discussion about the challenges of this process and the prospective ideas that could further Filipino-American research within the Southeast. Keywords: microaggression, intragroup prejudice, intraethnic microaggressions, Filipino-Americans, urbanism-ruralism

Where Are We with Education About Mental Health and Illness: A Survey Research

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Symphony Williams

Research Mentor(s): Sohyun An

The purpose of my research is to investigate public awareness of mental health and illness. This study is paramount because of the mental health crisis our world faces today. I conducted a survey research in which I used Google Forms and asked a series of questions about the participants' education, experiences, and opinions on mental health and illness. The total participants were 67. The analysis of survey responses resulted in several findings. First, 34.3% of the 67 participants had a diagnosed mental illness, and 72% of those participants suffer from some form of depression while 77.8% suffer from anxiety. These results reveal that an overwhelming number of people with mental illnesses suffer from anxiety, depression, or both. Even with these numbers, some participants endure other illnesses such as: OCD, Bipolar disorder, eating disorders, ADHD, and addiction. Second, 14.9% of people learned about mental health and illness from ages 3-10. Third, 73.1% of the participants believe that reading books on mental illness/mental health as a child would have changed their experiences with their personal mental health, and 58.2% believed that reading such books as a child would have changed their perception of other people with mental illness, and mental health as an overall subject. These findings suggest the importance of early education on mental illness to lessen the mental health epidemic.

Attitudes of Child Life Specialists Towards Telehealth

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Kathryn Bacon

Research Mentor(s): Suma Mallavarapu

Telehealth is the use of virtual platforms to facilitate interactions between patients and medical providers. Telehealth use has increased in recent years, and especially during the Covid-19 pandemic. Studying attitudes of medical providers towards telehealth is an important first step to effectively provide these services. Previous researchers have studied attitudes of physicians towards telehealth, but none have surveyed Certified Child Life Specialists (CCLS). CCLS provide coping strategies and support for children in medical settings (hospitals, rehab centers, etc.). The main goal of this study was

to understand attitudes of CCLS towards telehealth and how they used telehealth during the pandemic. We collected data on 63 CCLS via an online survey posted to the Association of Child Life Professionals forum in August and September 2020. Independent-samples t-tests were conducted to compare participants who had provided telehealth services and those who had not. We also collected data on level of exposure to telehealth, satisfaction with patient progress as a result of telehealth services, platforms used, challenges, and perceived benefits. Since the pandemic began, there was an increase in the use of telehealth among CCLS. The majority of participants agreed that telehealth in child life would facilitate job duties and communication among providers, help patients stay better informed, increase service speed, provide more comprehensive healthcare services, and improve tracking of patient status. Our findings highlight the importance of telehealth in child life during times of isolation and give us a better understanding of these services which are critical to children and their families.

Assessing Positive and Mixed Emotions Related to Racial Experiences on Campus

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Christopher Pauyo; Marie Stephens, and Grace Bowe

Research Mentor(s): Katherine White and Ravi Ghadge

As the climate of a university can impact the experiences and mental health of students, faculty, and staff (Budge et al., 2020), it is necessary to devote attention to race-related experiences that contribute to and perpetuate a university's racial climate. Past psychological research has focused on reducing negative emotional reactions to negative race-related experiences (Carter & Forsyth, 2020; Kim, 2016). Although this line of research is critical to improving the experiences of people of color, there is another avenue for improvement that is often neglected: increasing positive race-related experiences. Identifying positive and quasi-positive experiences among racial groups will help us understand how students, faculty, and staff perceive the on-campus racial climate at Kennesaw State University. Data was collected from KSU students, faculty, and staff who participated in focus groups, of 3-12 participants. During the interview, a facilitator invited participants to share their race-related experiences on-campus and in the community and emotional reactions. Another researcher took notes on participants' responses. Sessions were conducted virtually through Collaborate Ultra for an hour, and, at the end of each session, additional resources were offered for support and counseling if needed. This data will be analyzed using thematic analysis is in progress. Racial experiences will be coded as either positive, negative, or mixed. Participant emotions will also be coded, first for content, then for positivity or negativity. Faculty/staff and student responses will be compared with respect to types of positive and mixed experiences, and the emotional reactions to these experiences. The results will be presented to upper-level KSU administration to inform awareness of the present state of KSU's racial climate and future university-wide efforts to improve race relations. We also hope this research will both advance theoretical understanding of the relationship between racial experiences and emotional reactions and encourage other universities to undertake similar projects.

Perceived Productivity and Mental Health Amongst Students During the COVID-19 Pandemic

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Matthew Fenner, Marsalis Byrd, Madison Garvin, and Ryan Allen
Research Mentor(s): Anisah Bagasra

In the last few years, the mental health of college students has become a growing concern as the number of students using mental health services continues to increase. The introduction of COVID-19 at the beginning of 2020 brought this issue into even greater focus as many college students, as well as many others, are now faced with a whole new set of mental health challenges. Students are now met with new anxieties about not only their health but also about how to adjust to the worldwide shift of college classes to a predominantly online setting. Working from home adds many challenges to learning such as increased distractions and difficulty concentrating. This study aims to determine the impact of the COVID-19 pandemic on the productivity and mental health of college students through several stress, depression, anxiety and productivity scales. Data will be collected from approximately 150 students attending a large public college located in the Southeastern region of the United States. Students will be recruited through university email and club membership lists from the end of November through the 12th of February. The study will consist of an anonymous survey that includes the DASS-21, Perceived Stress Scale and a productivity scale. We expect students who are currently employed, international, classified as a freshman, or the primary caretaker of children (independent variables) to score higher on the DASS-21 and Perceived Stress Scale (dependent variables). In relation, we expect these individuals to score lower on the productivity scale as compared to their peers. These predictions are based off several studies we found regarding factors that had a significant impact on the mental health and success of college students before COVID-19. Data will be analyzed for descriptive statistics and correlations using SPSS.

Negative Emotions Connected to Racial Experiences

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Alondra Guerrero, Avery Britt, and Isabella Layton
Research Mentor(s): Katherine White and Ravi Ghadge

For many students, college is the first environment in which they experience racial diversity. Because of this, university campuses become microcosms for the working world including the negative interracial interactions. Harwood and colleagues (2012) found that students of color lack a sense of belonging on predominately white college campuses. They experience microaggressions, racial jokes and comments, and uncomfortable interpersonal interactions (Harwood, 2012). Racially charged experiences influence emotions and those emotions, in turn, influence future racial experiences (Kim, 2016). It follows that students, faculty, and staff who endure a negative racial climate on campus experience adverse effects on their emotions and future academic/ career success. This presentation will focus on the negative emotions and experiences of the participants. Data was collected through focus groups of students, faculty, staff. Participants were placed in groups based on ethnic/ racial identity to ensure comfortability with sharing personal experiences. Participants were interviewed about their perception of the racial climate on the university's campus and the surrounding county. The sessions were recorded, and researchers were present to take notes on the emotions and experiences. Data was transcribed, then coded using Grounded Theory. Results will be presented to the university's

administration, along with ways the university can improve the racial climate. Future publication of this research will shed light on the types of race-related experiences that occur on college campuses and the emotions associated with them.

Walking the Line: Planned Trajectory of Autonomous Cars on Driver Takeover Behavior

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Patrick Kielly, Eunice Baek, Amali Kahaduwe, Violet Filatova, Shane Howard, and Angie Son Pulido

Research Mentor(s): Kyung Hun Jung and Jack Labriola

Previous research on takeover behavior assumed that even when an automated vehicle (AV) reaches its operational limit, the AV can release the takeover request in a timely manner. However, it is also reasonable to assume that an AV that reached its functional limit crashes into something without releasing a takeover request at all. Even in such an extreme and disastrous situation, a head-up display (HUD) that shows the AV's planned route using augmented reality (AR) may allow the human driver to notice the potential crash and takeover control of the AV in time. To test this idea, we conducted a driving-simulator experiment where participants monitored the driving status of an AV with or without the AR-HUD that shows the planned route of the car. The data are currently being collected and the participants' takeover performance will be compared between the two conditions (with vs. without the AR-HUD).

GroupMe or GroupCheat? Student Perceptions and Reactions to Violations of Academic Integrity

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Andrew Manocchio

Research Mentor(s): Jennifer Willard

The rise of online classrooms has brought forth new concerns about academic integrity that may not have been present in traditional brick-and-mortar classrooms. Emerging social technology, such as GroupMe, an app used to facilitate group text-messaging, has added a new dimension to academic integrity concerns. However, almost no research has been conducted examining how this technology impacts student behavior in the classroom. The current study investigates the degree to which students perceive various GroupMe conversations as including violations of academic integrity. Participants will be randomly assigned to read one of six GroupMe conversations in a 2 (type of cheating: meeting to collaborate on an online assessment vs. sharing answers to an online assessment) x 3 (obviousness of cheating: no cheating, ambiguous, vs. blatant) between-subjects design. After reading the GroupMe conversation, participants' perceptions of the extent to which the conversation is considered cheating and how they predict they would respond to the presented situation will be assessed. Participants' personality, perfectionism, and characteristics (e.g., age, race, gender, GPA, academic concentration) will also be assessed. It is predicted that participants reading the ambiguous conversion will produce both a higher degree of uncertainty in perceptions of cheating and a higher degree of non-reactive responses (e.g., remaining in but not interacting with peers in the group chat) than participants reading

the blatant conversations. Additionally, we expect that participants' conscientiousness and GPA will be positively associated with their willingness to either remove themselves from a chat or report an instance of cheating. We plan to test our hypotheses via correlational analyses, analyses of variance, and regression. This study may provide insight into how students perceive instances of cheating in GroupMe, the circumstances in which GroupMe may become a catalyst for cheating, and the characteristics of students who may be involved in GroupMe cheating.

How Has Mental Health Changed for Gender and Sexual Minorities Due to COVID-19?

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Roger Otway

Research Mentor(s): Evelina Sterling

One of the most at-risk populations for mental health issues in the LGBTQ community. This population experiences higher rates of depression overall. Unfortunately, mental health is often forgotten in overall health and well-being. For members of the LGBTQ community who also experience significant physical health issues, such as chronic conditions, mental health (especially if not appropriately addressed) can further worsen leading to deteriorating physical health. This health inequity is often exasperated by social factors like disrespect, discrimination, stigma, and trauma. Given the current situation involving COVID-19, the overall health of the LGBTQ community has been further impacted, including severe effects of isolation and lack of access to regular and appropriate healthcare. This study is part of a much larger study involving African American gay men with multiple chronic conditions (both physical and mental) who also tend to suffer from disproportionate rates of morbidity and mortality related to their illnesses. Specifically, this study will focus on how African American gay men's mental health needs and experiences have been impacted by COVID-19. A mixed-method approach will be utilized to gather qualitative (interview) and quantitative (survey) data from African American gay men with multiple chronic conditions and their healthcare providers. Data will be analyzed to assess knowledge, attitudes, and behaviors around the mental health experiences of African American gay men before and during COVID-19. We aim to improve our understanding of why and how COVID-19 has impacted the mental healthcare process and outcomes among African American gay men living with physical and mental illnesses.

Positive and Negative Coping Mechanisms Due to High-Stress of COVID-19

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Stephanie O'Kon, Uchemdi Nduka, and Precious Slade

Research Mentor(s): Amy Buddie

Previous research on COVID-19 suggests that college students are experiencing increased symptoms of anxiety and depression (Saladino et al., 2020; Son et al., 2020; Wang et al., 2020). Researchers have argued that there is an "urgent need to develop interventions and preventative strategies to address the mental health of college students" (Son et al., 2020, p. 2). Although there is a growing literature on the negative effects of the pandemic on the mental health of college students, there is little research on how students cope with these negative effects. In this study we will be investigating the effectiveness of certain coping mechanisms in response to the high stress caused by COVID-19. We intend to do this by

developing a survey and administering it to the Kennesaw State University student body. The survey will initially consist of questions about students' symptoms of anxiety and depression before and during COVID. Next, students will be asked about the effectiveness of coping strategies before and during COVID (e.g., exercise, recreational entertainment, positive affirmations, hobbies). We hypothesize that students will experience more symptoms of anxiety and depression during COVID in comparison to before. We expect an increase in the severity of negative symptoms and a decrease in the effectiveness of most coping mechanisms post-COVID. We expect that even coping mechanisms that can still be utilized in a pandemic, like virtual human interaction, will not be effective post-COVID and may now be stressful for participants. Our study will help researchers better understand the effects of COVID-19 on mental health and can help propose solutions to high stress levels during a global pandemic.

A "Mindful" Approach to Multicultural Education

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Morgan Tikkanen, Erin Campbell, Maria Cabrera Yannotta, Yessica Landaverde, Niccole Marshall, Hayden B. Carter, and Desyre D. Langhorne

Research Mentor(s): Tracie Stewart and Katherine R. G. White

Intergroup bias and inequality are systemic issues with often-tragic consequences for individuals, social groups, and society as a whole. One way to address inequality is through multicultural education. However, students often regard these courses as challenging and may question their ability to meet this challenge. According to prior research, multicultural and diversity courses can improve intergroup relations; however, students may sometimes resist learning and responding to information in these courses and may report negative views of instructors teaching them. In the present research, we proposed that a “mindful” teaching approach can provide students with the resources needed to feel they can rise to the challenges and opportunities provided by multicultural courses. In fact, consistent with prior research, we predicted that multicultural courses taught with a mindful teaching style would lead to particularly positive responses to both course content and instructors, given that they offer both high challenge and high ability to meet that challenge. We tested our predictions by inviting participants to read and answer questions about one of eight randomly-assigned fictional transcripts of the first day of a psychology course. The transcripts varied in course/content (Multicultural Psychology or Cognitive Science); instructor race (Black or White) and instructor teaching style (Mindful or Mindless). We hypothesized a main effect of mindful teaching style yielding more positive responses to courses and instructors overall. We further predicted that multicultural classes taught mindfully would receive the most positive responses and multicultural classes taught mindlessly would receive the least positive responses, with Cognitive Science evaluations falling in the middle. If our hypotheses are supported, this research would contribute to understanding how the important topic of multicultural education can be taught in a way that enables students to get the most out of the courses, while enabling instructors to teach these courses without penalty.

The Relationship Between Big Five Personality Traits and COVID-19 Guideline Compliance

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Patrick Kielly, Ty Nelson, Shannon Hayes, and Christopher Woolford

Research Mentor(s): Ordene Edwards

The COVID-19 pandemic has remained a major threat to public health throughout 2020. Healthcare professionals and agencies, including the Center for Disease Control (CDC) have provided explicit guidelines to mitigate the spread of the disease. In light of this, researchers have sought to understand how psychological factors impact compliance with these guidelines. One line of inquiry has explored the relationship between the Big Five personality traits and compliance with COVID-19. For instance, Carvalho et al. (2020) found that extroversion was associated with violations of social distancing guidelines, whereas conscientiousness was associated with compliance with social distancing and handwashing directives in Brazil. In addition, Qian and Yahara (2020) found that neuroticism was positively correlated with preventative behavior. While this research has begun to shed light on the link between the Big Five traits and COVID-19 guideline compliance, the majority of the research has been conducted in Asia and South America, leaving a scarcity of such studies in the United States. Our research seeks to fill this gap by examining the relationship between the Big Five personality traits of students in the southeastern United States and CDC and campus-specific COVID-19 guideline compliance. Data has been collected from a university-managed subject pool, and students responded to online surveys about their Big Five traits and COVID-19 guideline compliance. It is hypothesized that high conscientiousness, agreeableness, and neuroticism will be associated with complying to COVID-19 guidelines, whereas low conscientiousness, agreeableness, and neuroticism will be associated with non-compliance. The results may highlight the role of personality as a spreader of the COVID-19 virus.

The Psychological and Mental Health Effects of COVID-19 on Students and Faculty

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Destyni Herbert, Briana Burnett, and Tangela Allen

Research Mentor(s): Amy Buddie

Previous research has shown the negative impact that COVID-19 has on mental health and substance abuse among individuals. For example, one survey of undergraduates in New Jersey showed an overall increase in mental health issues since the start of the pandemic (Kecojevic et al., 2020). Currently, little research has been conducted regarding how the pandemic has affected overall mental health, particularly comparing students and faculty. The present study is designed to examine the mental health effects of COVID-19 in students and faculty. Questions within the survey are used to identify how COVID-19 has progressed or impacted mental health. Specifically, participants will be asked questions assessing depression, anxiety, sleep patterns, and substance use. In addition, participants will be asked to report their prevention behaviors (e.g., handwashing, social distancing). Students will be asked questions about the impact of COVID-19 on academic performance, and faculty will be asked questions about the impact of COVID-19 on their job performance. We hypothesize that both students and faculty will experience negative mental health effects as a result of COVID-19. We also anticipate that the differences between faculty and students will be moderated by demographic factors, such as parenting, socioeconomic status, and marital status. Studies reveal that the mental effects that occur as a result of

a pandemic remain well after the outbreak is over. COVID-19 being the most recent outbreak gives us conclusive data within the current time. This information will allow us to have a better understanding on how the pandemic has caused disturbances regarding academics, mental health, and substance abuse issues. The data gathered from faculty and students will assist us in identifying effective ways for individuals to cope during a pandemic.

Interdependent Self-Construal and Student Academic Dishonesty via GroupMe

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Abi Jenkins and Taikayla Ramsey

Research Mentor(s): Jennifer Willard

The current study investigates the possible relationship between interdependent self-construal and students' academic dishonesty via a text message app, GroupMe. Students use GroupMe to discuss both personal, academic, and class-specific content. Interdependent self-construal focuses on the idea that people's concept of identity is determined by their group memberships. Markus and Kitayama (1991) argue that individuals with an interdependent self-construal are more likely to pay attention to others and to social context, and to consider others' opinions, desires, and needs. Prior research has shown that students with interdependent self-construal are more likely to cheat within the group and depend on their peers more than students without an interdependent self-construal (Nakashima et al., 2008). We sought to examine whether this finding extends to cheating occurring via GroupMe. Undergraduate students will be asked to complete an online questionnaire that measures interdependent self-construal and the extent to which they have engaged in academic dishonesty via GroupMe. We expect that students with a greater sense of interdependent self-construal will be more likely to use GroupMe to participate in academic dishonesty. Understanding what personality traits are associated with academic dishonesty that occurs through new technologies may be helpful in determining potential methods for deterring this behavior.

Perfectionism and Using GroupMe to Engage in Academic Dishonesty

Presentation - [Join now.](#)

10:40am – 10:55am

Undergraduate Student(s): Madison Martin and Addie Cook

Research Mentor(s): Jennifer Willard

Students with perfectionism tend to show poor academic adaptability (Rice & Dellwo, 2002). Because of their fears for failure in school, they may compensate for their self-perceived incompetency by committing academic dishonesty (Pino & Smith, 2003). The social media app, GroupMe, may be used as an outlet for academic dishonesty. For example, students can share answers to exams and other information via this app. In the current study, we investigate whether perfectionists are more likely to commit academic dishonesty through GroupMe compared to non-perfectionists. College students will be asked to complete an online survey assessing their perfectionistic tendencies, the extent to which they use GroupMe to commit academic violations, and their demographic information. We expect that participants who have higher levels of perfectionism are more likely to commit higher levels of

academic dishonesty by using GroupMe than participants who have lower levels of perfectionism. Our results may provide a better understanding of whether perfectionists utilize GroupMe to commit academic dishonesty in college.

The Role of Extraversion and Conscientiousness in GroupMe Activity

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Remy Wetzel, Jamie Broome, and Hannah Dalton

Research Mentor(s): Jennifer Willard

The current study examines whether two specific personality traits, extraversion and conscientiousness, correlate with frequency of GroupMe usage among college students. GroupMe is an instant text-messaging app that is popular among college students. Research with other social media platforms, such as Facebook, have shown that users are more likely to be extraverted than non-users (Brailovskaia & Margraf, 2016). People who are more extraverted and conscientious are more likely to use social media frequently because they have higher rates of perceived enjoyment (Wang et al., 2012). Although studies have been conducted using other social media platforms, there is a lack of information on whether personality traits are associated with GroupMe use. Participants will respond to an online survey containing questions about the rates of their extraversion and conscientiousness, as well as the frequency of their GroupMe usage. Participants will include college students from an introductory psychology course to represent our target demographic. We expect participants with higher levels of extraversion to interact with and use GroupMe more frequently than those who are less extraverted. We also expect participants with higher rates of conscientiousness to have higher rates of GroupMe usage because the interactions might aid in higher academic achievements. Thus, we expect positive correlations between the two personality traits and frequency of GroupMe use. Our study will help further the growing body of knowledge on the fairly new topic of how personality traits are related to social media use.

College Students' Use of GroupMe and Narcissism

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Aviana Parades and Claudia Heigl

Research Mentor(s): Jennifer Willard

This study examines the possible correlation between the use of a text-messaging app, GroupMe, and narcissistic personality traits among college students. GroupMe is a group text-messaging technology that college students use to communicate with peers in their classes. Prior research has shown positive association between narcissism and social media use, as well as problematic social media use (Kircaburun et al., 2018). However, no studies have specifically measured the use of GroupMe in relation to narcissistic personality traits. Thus, we will recruit college students who are enrolled in introductory psychology courses to complete an online survey in which they self-report their GroupMe use and complete a measure of narcissism. Participants will respond these measures using a Likert scale. Participants will also complete demographic measures. We expect that participants that engage

in more social media, such as GroupMe, tend to have more narcissistic personality traits and tendencies. As such, there should be a positive association between the use of GroupMe and narcissism. Results from this study may provide further understanding of how social technology use relates to personality among college students.

Narcissistic Personality Traits and the Use of GroupMe among College Students

Not presenting.

Undergraduate Student(s): Bobbi Ayres

Research Mentor(s): Jennifer Willard

The purpose of this project is to examine the relationship between college students' narcissistic personality traits and their behavior on GroupMe. GroupMe is application that facilitates group text messaging and is popular among college students. Although they are not the same social media platforms, Facebook use can trigger narcissistic personality traits (Szücs & Gail, 2020). Additionally, individuals who specifically seek gratification through social platforms tend to display more narcissistic personality traits (Kircaburun et al., 2018). Researchers also find that more narcissistic individuals use social media platforms as a means of validation (Zia & Malik, 2019). Thus, it may be possible that college students who display more narcissistic characteristics would be likely to use GroupMe in more narcissistic ways, such as engaging in more attention seeking behavior. In the current study, college students enrolled in introductory psychology classes will be asked to complete an online survey that measures their level of narcissism and their GroupMe behavior. It is expected that there will be a positive association between the two. Participants will also complete demographic information. These data may be useful for identifying narcissistic behavioral tendencies among college students using GroupMe.

Political Identity, Racial Attitudes, and Physiological Fear of Outgroup Races

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Cymone Parker

Research Mentor(s): Ebony Glover

Previous research has shown that political orientation and race are associated with racist attitudes. White participants are more likely to have racist attitudes opposed to non-white participants. There is little research comparing how these factors relate to fear of racial out-groups. Our laboratory uses the fear-potentiated startle paradigm to measure a participants' startle responses (physiological measure of fear) when they are shown either an in-group or out-group face. Participants were asked to report their political identity (7 -point Likert scale) ranging from strongly conservative to strongly liberal. White participants were given the Attitude Towards Blacks Scale and Black participants were given the Attitude Towards Whites Scale. It is hypothesized that participants who identify as more conservative or have more negative attitudes towards an outgroup race, will express greater fear of a racial out-group face compared to participants who identify as more liberal or have more positive attitudes towards out-groups. Correlations among political identity, racial attitudes, and startle to a racial outgroup face were assessed. The more conservative White participants reported more negative attitude towards Black

people, $r(35) = -.40$, $p = .01$. Also, White participants who reported more negative attitudes towards Black people expressed greater startle responses to Black faces, $r(12) = -.81$, $p < .001$. Black participants who reported more negative attitudes towards White people also showed greater startle responses to White faces, $r(6) = -.85$, $p < .01$. These results underscore the relationship between racial attitudes and fear of out-group races.

Friend or Foe? Blame-Taking and Informant Behavior Among Friends and Strangers

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Erika Rodriguez Rivera, Alex Goldstein, and Andrew Manocchio

Graduate Student(s): Naomi Katz

Research Mentor(s): Jennifer Willard

Approximately 36% of DNA exonerees have falsely confessed or pleaded guilty (The Innocence Project, 2021). Some individuals report falsely confessing or pleading guilty in order to protect the true perpetrator (Mallory et al., 2014). In these cases, false confessors and perpetrators typically have a pre-existing relationship (Gudjonsson et al., 2007). The current study examined whether relationship status (stranger versus friend) impacts false confession rates and informant behavior. Pairs of strangers or friends volunteered for a study purported to examine communication. Participants then completed tasks designed to support the cover story. Midway through the study, one participant from each pair was randomly enlisted as a confederate who was given two tasks. First, they would cheat on an experimental assessment and thereafter send a text message plea asking their innocent partner to take the blame. The innocent partner was then confronted about the cheating and provided with the opportunity to confess to the violation. We were thus interested in the innocent participant's choice to either falsely confess, maintain their innocence, or maintain their innocence and provide evidence against the perpetrator (i.e., participant confederate). We expected that innocent participants will be more likely to provide a false confession when the perpetrator is their friend rather than a stranger. Furthermore, innocent participants who maintain their innocence will be less likely to provide evidence against the perpetrator who is a friend versus a stranger. These data may help individuals in the legal system to determine under what conditions false confessions and informant behavior occur.

Gender Differences in Life Skills Among Foster Children

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Hannah Sexton

Research Mentor(s): Christopher T. Allen

Previous research has found that youth who "age out" of foster care are at risk for a range of negative outcomes. The current project examines gender differences in life skills among older foster youth in order to identify potential avenues for intervention.

Perceptions of COVID-19 Among Religious Leaders

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Anna Anderson

Research Mentor(s): Anisah Bagasra

The research shows how religious leaders have been affected and have attempted to adapt to COVID-19. The research was compiled of responses from religious leaders and affiliates to get a better understanding of their opinions. The data we are collecting is being analyzed so that we, the researchers, can determine if religious leaders are using their title to lead the community that follows them on the safest path or not, as well as if they are spreading an accurate message to their community about the COVID-19 Pandemic. The purpose of being able to identify how religious leaders are responding to the pandemic appropriately is a crucial telling of how we, as a country, are handling the pandemic; as well as understanding the severity of it. Where are they getting their information, is it from a reputable source? A lot of research in the past has shown how some religious leaders simply choose not to follow laws and safety guidelines under the premise of their religion and their higher power of choice. In fact, a lot of pastors have recently passed from not abiding by the guidelines put in place. It is no surprise that a lot of religious leaders would choose to listen to God over the CDC, but it is telling when these religious leaders are spreading this false hope to a community and eventually spreading the virus more. In the focus group, 327 or 976 responses believed that the media was making COVID-19 bigger than they believe it is. The amount of damage this mindset can do to a community is the reason this research study was conducted. You still have some religious leaders who believe holding a service is more important than a global pandemic. Luckily, there are still religious leaders out there who are attempting to accommodate their community during these troubled times. From virtual services to standing outside of someone's home to preach to them, most religious leaders have been trying their best to work around this pandemic, despite how exhausting it may be on them. Out of 976 responses, from different religious leaders, more than half of them are following and listening to the CDC guidelines. This goal of this research was to show people how COVID-19 has affected religious leaders, their followers, and potentially their own religious views.

Sociology & Criminal Justice

The Future is Female: An Examination of Officer-Client Communication of Risk Using a Sample of Justice-Involved Women

Presentation - [Join now.](#)

3:00pm – 3:15pm

Graduate Student(s): Darian Hailes

Research Mentor(s): James McCafferty

The purpose of this study is to examine the impact that relationships have in the correctional journey of justice-involved women. Previous relationship literature, based on Sampson and Laub's social control theory, has found that stability and support in an offender's life can lead to desistance from crime. Though there has been an overall decline of individuals involved with the justice system over the last decade, researchers have found that the rate of justice-involved women has increased. Likewise, the use

of community corrections as punishment has increased as an alternative to traditional incarceration. As recently as 2020, the Bureau of Justice Statistics reported an increase in women entering the national jail system. This increase of justice-involved women, coupled with concerns of the treatment of women by previous criminology research, are the backbone for this study. These concerns range from the unequal assessment of women in correctional institutions and while reentering society, the mismanagement of female offenders' needs, and the lack of equity and care by the justice system to accommodate this increasingly present population. This study uses secondary data to answer the following questions: First, does the officer-offender relationship impact an offender's recidivism rate. Second, does an offender's positive relationship with their supervising officer affect their likelihood of completing treatment. Finally, what role does officer authoritarianism have in the offender-officer relationship. The findings were favorable in affirming each of the hypotheses. This research shows that the current justice system structure is capable of making significant differences with the systems already in place. These improvements can have a large and lasting impact on the lives of justice-involved women and may effectively reduce their presence within the justice system if handled correctly.

Getting a GRIP on Jail Reentry Programs

Presentation - [Join now.](#)

11:00am – 11:15am

Graduate Student(s): Claire Ctibor

Research Mentor(s): Beverly Reece

Jail reentry programs have increased in popularity when rehabilitation-focused policies erected in the 1990s. Previously, more attention has been given to prison reentry programs as the criminal justice-involved individuals typically participating in these programs are incarcerated significantly longer than those in jails. Investigating jail reentry programs is important as most individuals participating in these programs, whether one-time offenders or life-long offenders, pass through jails at some point in their criminal career. Having successful reentry programs at the jail level could potentially reduce the prison population by assisting and preparing individuals returning to the community from jail. The current research encompasses a thorough review of the existing literature on reentry programs, including the history, types, and results of such programs in order to inform a discussion on policy suggestions and implications.

A 10-Year Post-Analysis of the Maya Health Toolkit for Medical Providers

Presentation - [Join now.](#)

11:20am – 11:35am

Graduate Student(s): Lorena Garcia-Bochas

Research Mentor(s): Evelina Sterling

Many researchers have overlooked Indigenous Health's field within the Americas when discussing health disparities research. In Central and South America live the countless Mesoamerican ethnic groups today. One of the oldest known is the Maya people. The Maya have been through various cultural struggles with the Spanish conquistadors of the past and the current anti-indigenous

discrimination, violence, and rhetoric of today. Due to these fears, many Maya has migrated north to the United States for a better opportunity and a peaceful life for their families. In doing so, they face many health risks to their overall physical, mental, and social well-being. In 2010, a Maya Health Tool Kit was created by Dr. Alan Lebaron to help the Maya living in the U.S. better navigate the healthcare system. Our primary purpose is to reexamine our Maya Health Tool Kit. Then, determine what changes and updates are needed to be made to keep this "living" document current. Our methodology will perform comprehensive, open-ended interviews and pinpointed surveys with healthcare providers. These interviews and surveys will showcase the gaps in the Maya Health Tool kit to be filled in and compile the needed recommendations to update the tool kit in the future. The overall conclusion is creating more comprehensive, culturally, and socially relevant recommendations for a future Maya Health Tool Kit.

Racial and Socioeconomic Differences Influencing Obesity Amongst Middle Aged Women

Presentation - [Join now.](#)

11:40am – 11:55am

Graduate Student(s): Morgan Woods

Research Mentor(s): Evelina Sterling, Thomas McElroy, Phaedra Corso, and Lisa Ganser

Few studies have examined the relationship between racial and socioeconomic disparities and health-related differences in obesity. Studies suggest that racial and socioeconomic disparities can influence the mental and physical well-being of an individual. Obesity is a disease that affects many Americans and has become an epidemic affecting 42 percent of the American population. Obesity, especially morbid obesity, is a risk factor for many other obesity-related diseases such as diabetes, cardiovascular diseases, and hypertension. Specifically, studies have shown that women are more likely to be overweight and or obese than men. The Healthcare Avoidance study consisted of 1190 middle-aged women. This project addresses obesity from a holistic perspective by performing a secondary analysis and examining how stress from socioeconomic status, race, and mental health impacts obesity and other chronic conditions in women. This study focused on two racial groups of women: White women (non-Hispanic) and Black women (non-Hispanic). Thus, a comparative analysis of the two groups will show the relationship between trends at the intersection of mental health (self-esteem, stress, etc.) and physical health (eating behaviors/ patterns) and obesity. Results from this study should indicate that Black women (non-Hispanic) will have a higher prevalence of obesity and chronic diseases than white women and a higher prevalence of psychological stress than white women due to socioeconomic status and sociocultural influences. This would suggest that socioeconomic status and race barriers can affect health and or behavioral outcomes.

Technical Communication and Interactive Design

Building False Trust During COVID-19: How Health Information is Circulating Differently in the South

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Cristy Kennedy

Research Mentor(s): Sara Doan

During COVID-19, African Americans in the United States have seen hospitalization rates 3x higher than the national average (Kulke, 2020; Burton, 2020; Soucheray, 2020). Furthermore, African American communities tend to rely heavily on social media sites such as Twitter for health information, (Brown, 2019) carrying this trend into the COVID-19 pandemic. While Twitter has potential to reach diverse audiences through its state and health organizations, it also has potential to spread misinformation regarding important health matters (Hope, 2020; Kouzy et al., 2020; Walwema, 2020). For example, Twitter contains “personalized ecosystems” that African American communities have created to circulate information of personal relevance about COVID-19. Although helpful in theory, they often lack higher organizational resources. This study examines how strategies for spreading health information differ between Twitter accounts of African American organizations and state health organizations located in the south. We conduct three 5-8 person African American male focus groups and a data analysis on over 4,626 Tweets from select Twitter accounts to analyze how they are building trust and engagement about preventative health behaviors during COVID-19. Two rounds of preliminary coding have already shown that public health organizations do not fully understand the needs of minorities, while minority organizations find it hard to continually provide content. This study makes a unique contribution to the topic of social media in health communication by focusing on an underserved demographic living in an overlooked region and the depths to which change can occur in communication to directly benefit them during a global pandemic.

Southern Polytechnic College of Engineering & Engineering Technology

Civil & Construction Engineering

Microplastics in Water Treatment Plants

Presentation - [Join now.](#)

3:40pm– 3:55pm

Undergraduate Student(s): Isabella Seeton

Research Mentor(s): Amy Borello Gruss

The growing of the consumer culture has contributed to the massive rising of microplastic in environmental samples. Several studies have shown that the rise in microfibers and microplastics has to do with common household items such as facewash, toothpaste, clothing, and cleaning supplies. In this research, we began by collecting samples from a North Georgia drinking water plant. Fluorescent orange polyethylene microspheres, 600-710-micron, were added to assess the extraction methodology. These microspheres were extracted using the National Oceanic and Atmospheric Administration (NOAA) procedure. Filtered samples were analyze on filter paper underneath a 3.5X-180X Zoom Stereo Microscope. The filter paper was labeled by quadrants to be able to analyze the samples easier and more efficiently. Then, natural organics were differentiated from the added polyethylene microspheres

and the existing microplastics from the sample. We have found a large number of microplastics/microfibers from the environmental sludge samples that were collected. Additionally, not all the microspheres that we embedded in the samples were accounted for, indicating that the extraction procedure damages the microplastics within the sample. From this, we will further assess more samples with microplastics in order to further our research, as well as compare various extraction methods.

Buckling Analysis of Open-Top Bridge Trusses

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Ronald Hernandez

Research Mentor(s): Mohammad Jonaidi

Finite Element Analysis (FEA) is a computerized method for determining the behavior of engineering elements under various loading and environmental conditions. Models can be comprehensively generated and sectioned into finite elements and the software can determine important stages such as buckling and failure of the structure. Computer based FEA offers significant benefits by cutting down cost and time to perform analysis on complex structures. In this research, the powerful software Abaqus is used to make models and perform buckling analyses for Half-Through trusses as specified by American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications. Some of the structures that can benefit from this analysis are steel pedestrian bridges. Using the analogy of beam on elastic foundation, Timoshenko, a pioneer in structural engineering, derived a mathematical equation for calculating the critical buckling load caused by the compressive load on the top chord, in terms of buckling length coefficient, rigidity of members and intensity of axial load. However, research on this topic is limited in the literature and further study is needed. The goal of this research is to enhance, to expand, and to examine the behavior of trusses in detail. The task includes performing analysis on the buckling of the top chord for out of plane instability of Half-Through trusses with varying “n-panels”, and varying L, length of top chord, and H, height of vertical member of the truss. This paper attempts to find factors influencing the critical buckling of top chord of trusses. It is also intended to continue this study in a second phase by constructing structural system prototypes in the laboratory. Each structural system will be tested, and the results from laboratory testing will be compared with the results from an identical computer simulation to further validate the computer-based modeling procedures.

Review of Finite Element Analysis (FEA) of Concrete Reinforced Materials

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): George Williams

Research Mentor(s): Mohammad Jonaidi

As a heterogeneous and generally anisotropic material with both brittle and ductile failure modes, concrete is a difficult material to simulate using finite element models. Coupled with discrete reinforcement interactions and different material properties depending on strain degradation, many different numerical models are available for accurately representing concrete with varying tradeoffs.

This study provides a review of general Finite Element Analysis (FEA) techniques and methodologies, how concrete and reinforced concrete are unique, and examples of accurate modeling to assist in further understanding this subject. Finite element modeling of concrete and reinforced concrete structures offers considerable complexity due to concrete's composite structure and a large difference in its compressive and tensile strengths. The two preeminent methods of solving concrete systems are the Smeared Crack Method (SCM) and the Concrete-Damaged Plasticity (CDP) model. The powerful program Abaqus, used in this study, is capable in utilizing these models in the concrete analysis. The SCM and the CDP model both offer a method of simulating concrete complex behavior in finite element analysis software packages, each with their own advantages and disadvantages. While the SCM is well suited to non-cyclic loading and is less computationally intensive, it is often unstable without careful consideration of reinforcement. The CDP model is more computationally intensive and requires a larger amount of test data to yield accurate results, but it models the behavior of concrete under repeated load cycles and is well suited to simulating seismic loads and fatigue-like behavior, as well as accurate crack prediction. Overall, the field of concrete finite element analysis is still developing, and future advancements in the form of existing model refinements or entirely new models may still be possible.

Electrical & Computer Engineering Technology

Connected Autonomous RC Maritime Vehicles (Boats)

Presentation - [Join now.](#)

12:00pm – 12:15 pm

Undergraduate Student(s): Tyler Davison

Research Mentor(s): Billy Kihei

Vehicle to everything (V2X) is one of the most prevalent communication systems implemented in smart city infrastructure. Given the success of implementing V2X in automobiles, there has been interest in applying this technology to maritime applications. Unfortunately, current methods require the use of sizeable vessels and large open bodies of water. The goal of this project is to develop a portable, cost effective V2X platform that can be used on small bodies of water. This platform was equipped with various sensors and radios that facilitate autonomous movement and V2X research.

Bladeless Piezo-Triboelectric Hybrid Device for Wind Energy Harvesting

Presentation - [Join now.](#)

12:20pm – 12:35 pm

Undergraduate Student(s): Mervin Johns, Aidan Mcdevitt, John Giles, and Joshua Streit

Research Mentor(s): Sandip Das and Valmiki Sooklal

Triboelectric and piezoelectric devices can generate renewable electricity by suitable for various types of energy harvesting applications. Triboelectric devices operate from contact between two oppositely tribopolar materials and electrostatic induction, while piezoelectric devices operate on mechanical stress. Only light mechanical motion is required for these devices to output electricity. In this project, we are designing a leaflet structure that incorporates both devices to harvest wind energy. We have

fabricated triboelectric devices using polydimethylsiloxane (PDMS), which can be made by mixing elastomer base and curing agent. The solution is then pasted onto a copper electrode. A spin coater is used to deposit a thin film. For our tribonegative material, we used Kapton tape, which performs well because of its abundance of polyimide molecules. When the tribomaterials contact with each other, electrical charge is exchanged, forming an electric field. When separated, the electrodes generate charge to counteract the electric field. We have also fabricated a test structure to perform measurements on the triboelectric devices. Following, a mechanical structure was designed and fabricated to simulate the deflection of the leaflet when hit by wind. We determined a typical wind speed produced by a passing car on the highway and then modeled the leaflet in SolidWorks and ran a flow simulation to determine the force we expect the wind to exert on the leaflet. Using this force data, we ran a second simulation to determine how the leaf would bend under this load. We designed the structure to bend the leaf 38cm for out experimental measurements. This allows us to test our devices under a standard wind speed condition without the inconsistencies faced in the real world. Device design, test structure fabrication, simulation and experimental results will be presented.

My CarPal

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Andrew Bluhm and John Herring

Research Mentor(s): Billy Kihei

We seek to allow users with cognitive disabilities to gain easier access to information and communication to help them throughout their day. To accomplish this, we created a handheld device composed of three buttons. On demand, users will have the current day of the week, time, and date recalled to them. Users or care takers can also record voice memos and repeat their voice memos back to them. Lastly, we integrate a Calendar API to collect the events set by a user or caretaker. Caretakers can update the users Calendar on the device remotely.

Rollover V2X Soft Antenna for Vehicular Safety

Presentation - [Join now.](#)

1:20pm – 1:35 pm

Undergraduate Student(s): JiWoo Park, Devansh Singh, Aya Alazzawi, and Ian Ross

Research Mentor(s): Billy Kihei

Vehicle-2-Everything (V2X) technology can make roads safer by allowing vehicles to communicate with each other. The goal of V2X is to reduce accidents where there is not a line-of-sight of the other vehicle, such as at intersections, in harsh driving conditions, and around curves. Considering that the antenna for V2X will be mounted on the roof, how then should a turned over vehicle communicate reliably with other vehicles if another antenna doesn't also exist on the bottom of the vehicle? We explore using soft-robotics for deploying a spare antenna from under the vehicle. Experiments show that when the antenna is in a roll-over environment that packet reception rate is low, compared to normal operation.

Smart Shoe Performing Real Time Motion Classification using Machine Learning for External Motion Alerts in Vehicles.

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Kaleb Key

Research Mentor(s): Billy Kihei

As networked sensors become more ubiquitous and integrated into the Internet-of-Things, various technologies can be leveraged to provide an increased amount of safety to the public. In this research we have constructed a pressure sensor within a shoe covering two regions of detection: heel and toe. The pressure sensor is centered around polymeric foil Velostat which has the property of changing its resistance dependent upon amount of pressure applied. When made into pads placed inside of the shoe and connected in a circuit, we can record the pressure values from the pads over time and use them to train decision trees for classification. We assess the performance of our sensor + model in a deployment scenario where inferencing is accomplished at the user wearable. We envision our wearable to assist in alerting approaching vehicles of the type of mobility of surrounding users with our system.

Autonomous Vehicle Fleet Communication and Battery Dependency

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Hakeem Wilson

Research Mentor(s): Billy Kihei

In recent years, the concept of autonomous electric vehicles has taken the automotive industry by storm. Yet, there are a few large concerns that still hinder the progression of this technology. The first would be the safety of a car that drives with no user input. Secondly, many consumers suffer from fear of range anxiety in electric vehicles. However, with the advent of Vehicle to Everything (V2X) communication, it is possible to integrate cars into a shared communication network where a plethora of safety information can be stored and shared, thus allowing cars to interact with each other to create a safer driving environment. As battery technology continues to improve, smart battery monitoring also improves. By monitoring the system loads, battery state of charge, depth of discharge and estimated life remaining can all be calculated and used to optimize battery life and health.

Secure Traffic Cabinets

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Michael Young and Hannon Shepard

Research Mentor(s): Billy Kihei

Traffic systems are becoming more and more connected and intelligent. As electronics in traffic cabinets become more connected, it is important to secure the electronics in a traffic controller. We develop a machine learning method for detecting lock picking on a traffic cabinet using accelerometer and

gyroscope data. We implement our method on an embedded computing platform, the M5StickC Plus. We deploy our embedded system inside traffic cabinets at an offsite location for testing and validation. Currently, our accuracy is above 90% with a low false alarm rate.

Fault Analysis of Partially Shaded Photovoltaic Systems

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Harrison Iles

Research Mentor(s): Yousef Mahmoud

Faults occurring in solar PV systems may subsequently lead to safety hazards, reduce reliability, and system efficiency. While many fault detection methods exist to detect faults and protect solar PV systems, recent studies revealed that they fall short under certain conditions such as partial shading, and low irradiance which may hide low faults current that are undetected. This project focuses on pattern analysis of faults in terms of power, fault current, and voltage under homogenous and partial shading conditions at varying fault resistances and locations. The patterns observed through MATLAB Simulink simulations are then explored to detect faults in PV systems. The method is tested under various atmospheric and partial shading conditions through Matlab/Simulink.

Onboard Wave Energy Harvesting for Sustainable Boats and Ships

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Marceline Lewis, Lynna Johnson, Shane Bonifacious, and Travis Hall

Research Mentor(s): Sandip Das

In this research project, we have designed and fabricated an ocean wave energy harvesting device to make boats and ships more sustainable by producing renewable electrical energy onboard. The device has a doughnut-shaped structure with a linear generator bent in a toroidal shape around it. A rolling spherical magnet is placed inside the doughnut cavity. This design allows the device to gather energy from multiple directions of motion on the boat – as the boat tilts, the magnetic ball rolls and consequently produces electrical energy. Several different designs were conceptualized and then modeled in CAD, and subsequently 3D printed and assembled. Multi-phase 24 AWG copper coils are wound onto the doughnut. The output terminals of the coils are connected to an energy harvesting circuit which converts the output AC current into DC current for high efficiency battery charging. We have also designed and fabricated a wave simulation platform to test our prototype devices in the lab. For on-site experiments, we are currently designing a compact remote measurement and data logging circuit. The battery-powered data logging circuit consists of digital accelerometer, gyroscope, GPS module, Micro SD card reader and current/voltage/power measurement chips. We will demonstrate and present the device design, fabrication methods, and performance results of our prototype.

Monitoring ADL Activities with Raspberry Pis Using WiFi Channel State Information

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Chris Hunt

Research Mentor(s): Fangyu Li

With the rapidly growing popularity of the internet of things (IoT) devices, new technologies are becoming increasingly prevalent in the average home. Advances in human motion tracking show its potential to be a versatile sensor for gesture and location detection in IoT systems, but this impact is limited due to expensive equipment and complicated installation. Many tracking systems are impractical for the average consumer, while cheaper camera-based systems are often seen as an invasion of privacy. Research into WiFi channel state information (CSI) tracking shows promises in using WiFi devices to track movement and gestures without collecting video information, but many of these systems use modified hardware and/or laptops to extract CSI resulting in system dependence on specialized and expensive equipment. This project aims to test how effective a practical, low-cost WiFi tracking system would be in detecting activities of daily living (ADL) by using Raspberry Pis and the Nexmon CSI extraction software. Raspberry Pi is a small and inexpensive alternative to a laptop or modified router. This makes Raspberry Pi based tracking systems a viable candidate for monitoring ADL. A tracking system using multiple Raspberry Pis will be tested for how accurately it can detect different types of motion. These tests will start by testing the system's capability to detect movement in an area and will later move to distinguishing a single user's common motions like walking, sitting, lying down, and opening a door. If these tests are particularly successful, then tests for detecting walking direction and detecting multiple users will be conducted. The completed project is expected to be a small system consisting of four Raspberry Pis that can detect two to three specific actions performed by a single user with a high degree of accuracy.

Design and Fabrication of a Stair Climbing Soft Robotic Chair for Disabled and Senior People

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Axle Wiley and Sky Papendorp

Graduate Student(s): Yvanne Komenan and Olukayode Iyun

Research Mentor(s): Turaj Ashuri and Amir Ali Amiri Moghadam

In this paper we will explore the capabilities of a soft robot that is able to carry a person upstairs, designed for senior and disabled people. By making this robot out of soft compliant materials we allow for greater maneuverability and there is no switching between chairs to get upstairs. This design allows the user to gain back independence which improves overall happiness and wellbeing. The model that we have made has three wedge shaped actuators that when filled with pressure can form either a round wheel for normal flat terrain or expand to easily go upstairs. Since we will be using NinjaFlex there is a specific balance of pressure to allow give in the wheels, in round form, making small objects like rocks or cracks undetectable to the user. When in the expanded form the pressure is much higher making it stiffer to effectively climb stairs. The model we are making will be 1 square foot and capable of carrying 1-pound upstairs. The model will be made of soft and hard components, with the wheels being the primary source of compliant materials and the chair portion and its connection to the base being hard

to effectively secure an object, like a person. To avoid unnecessary spending and having multiple models we used Finite Element Analysis to examine the effectiveness of the actuators in the wheels. This is critical because it allows us to see the effects of stress-strain relations, failure, bending, buckling, and stiffness. This paper will also offer knowledge on 3D printing using NinjaFlex.

STEM-PASS Program with Marietta Schools Using the TI-RSLK as a Tool

Presentation - [Join now.](#)

1:40pm – 1:55pm

Undergraduate Student(s): Bryanna Willis and Zoe Crisp

Research Mentor(s): Cyril Okhio

Women and minorities in STEM (especially in engineering) still lag behind their traditional male counterparts in university enrollment, nurturing, retention, graduation, placement, and tracking. This study explores and compares the scores of the top six feeder high school's test scores to Kennesaw State Universities enrollment, retention, and graduation rates broken down by gender and demographics. Lassiter, Allatoona, Etowah, Harrison, Marietta, and North Cobb High Schools data was analyzed to examine whether female and minority students were performing on the same level as their traditional counterparts in STEM areas, to first determine whether that was the cause of the gap. KSU was then studied and analyzed on enrollment, retention, and graduation rates. The purpose of this project is to show how women and minorities are not as stimulated and supported in STEM fields (especially in engineering) as traditional males are, and to propose a solution as to how peer support can change that. There is a serious and fixable discrepancy in the current Engineering Pipeline, and that is where this research effort will show that having a STEM Peer Augmented Success Support (STEM-PASS) will not only help women and minorities, but also get them to want to be more involved in STEM-based careers. The results of this research effort will show and point the way to a sustained and fundable program for this local region in the short term and nationally in the long term.

Mechanical Engineering

Design and Development of a Novel Soft Gripper Manipulated by a Robotic Arm

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Derek Price, Bryce Cianciotto, Logan Spencer, and Martin Garcia

Research Mentor(s): Ayse Tekes

This study presents the design and development of a tendon-driven soft gripper manipulated by a 4 DOF robotic arm. The proposed robotic arm and the gripper explore the new areas focusing on increasing the grasping performance of the gripper as well as the workspace. The gripper is designed as a 3 finger and driven by tendons using two servo motors. The tension of the strings is adjusted using a pulley mechanism and a string. The opening and grasping of the soft gripper are accomplished by each motor. The wide opening allows the gripper to grasp wide objects. The parallel robotic arm motion is actuated by 4 motors. Each motor is mounted on a spherical shoulder plate while circular plates with angles axle

extrusions are also attached to the motors. The axles are angled so that their axes of rotation converge to the center of the shoulder plate. The vertical and lateral motion of the robotic arm is controlled by the series linkages connected to the axles, thereby actuating the forearm of the mechanism. The robotic arm is 3D printed in polylactic acid (PLA) and the single piece designed soft gripper is 3D printed in thermoplastic polyurethane (TPU). The gripping force applied by the gripper is obtained using flexible sensors attached to the tip of the 3 fingers. The finite element analysis is performed in Ansys and the link lengths are optimized to trace the desired workspace. The mechanism is tested for its grasping and lifting of various objects showing promising superiorities in terms of its grasping capabilities mimicking the human hand. If the robotic arm is mounted on a moving platform, then it can serve as an assistive robot for the elderly.

Simulating Vesicle Deformations Under Fluid Flow

Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Dylan Stacy

Research Mentor(s): Yizeng Li

Self-propelled microrobots have the potential for use as carriers and probes in narrow spaces and channels (Alapan et al, 2019). They can potentially deliver drugs and diagnose disease, but their functionality depends on the deformation and mobility of them. In this work, we develop theoretical models to quantify vesicle deformation under fluid flows by modeling the vesicle as a layer of solid structure with low elasticity. The fluid is modeled as a Newtonian flow. The Fluid-Structure Interaction Modulus in COMSOL Multiphysics is used for numerical simulation where a vesicle sits in a fluid-filled channel. In the model, a shear velocity is applied to a horizontal inlet at the top of a channel, which is modeled as infinitely long by imposing period boundary conditions. The horizontal flow will generate laminar flows, which deforms the vesicle. The vesicle deformation will be quantified as a function of the flow rate, the viscosity of the fluid, the height of the channel, and the Young's Modulus of the vesicle. In addition to the deformation, we will also quantify the shear stress on the vesicle from the flow.

Computational Characterization of Carotid Bifurcation Hemodynamics under Microgravity

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Graham Quasebarth

Research Mentor(s): Philippe Sucusky

The common carotid artery (CCA) is a major blood vessel connected to the aorta and supplying blood to the head. The CCA separates into two branches, namely the internal carotid artery (ICA) and the external carotid artery (ECA), and the bifurcation is particularly vulnerable to atherosclerosis. This disorder consists of the accumulation of lipids in the arterial wall and the subsequent formation of a plaque, whose rupture may lead to stroke and death. A recent study conducted on astronauts returning from the international space station suggested a link between long-term spaceflight and atherosclerotic plaque development. Supported by previous research that established a correlation between plaque formation and blood flow abnormalities, we hypothesized that microgravity could produce stagnant,

retrograde blood flow characteristics in the bifurcation, like those known to promote atherosclerosis. Therefore, the objective of this study was to quantify computationally the effects of microgravity on carotid bifurcation hemodynamics. Realistic 3D carotid geometries were reconstructed from 2D ultrasound images and the flow was characterized under microgravity (0G) and unit gravity (1G) using computational fluid dynamics in terms of carotid wall shear stress (WSS) directionality and magnitude. WSS predictions suggested a higher degree of flow stasis and reversal in regions prone to atherosclerosis under 0G, which translated into abnormalities in WSS magnitude and directionality. The study demonstrates the adverse effects of microgravity on carotid hemodynamics and suggests a new risk posed by long-term spaceflight on human health.

Thermal Properties of Clove Seeds

Presentation - [Join now.](#)

3:00pm – 3:15pm

Graduate Student(s): Navid Esfahani and Omar Figueroa

Research Mentor(s): Sathish Gurupatham

Clove (Curcuma longa L.) may be considered as the best of all the known antioxidants. The medicinal properties of clove are significant, and clove has been a home remedy for curing several ailments and diseases. Health benefits from the use of clove have been known over the centuries. Apart from culinary uses, clove oil possesses anti-fungal, anti-viral, anti-microbial, anti-diabetic, and anti-inflammatory properties too. The knowledge of the thermal properties of clove seed is essential for the design and analysis of its processing and the processing equipment with respect to heat transport. There has been no work done on thermal properties of clove seed in the past. Thermal conductivity, specific heat, and thermal diffusivity of the clove seed were measured experimentally using the transient hot bridge method. The specific heat of the seed was also measured using the calorimeter method and found to match very closely. In the experiment, thermal conductivity, specific heat, and thermal diffusivity of the seeds were measured to be 0.0549(W/m-K), 0.002823) KJ/Kg-K), and 2.87242 mm²/s.

A Numerical Analysis of Biomimetic Swimming of Larval Zebrafish Robot

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Graham Quasebarth

Research Mentor(s): Dal Hyung Kim

Researchers today have made many practical approaches towards improving the mobility of small-scale robots for a variety of potential applications in the biomedical field, often by designing them after animals. A larval zebrafish (Danio rerio) is one of the most popular lab animals, and it exhibits a basic set of locomotor patterns on a small-scale to move in a liquid environment. Hydrodynamic simulation is essential to the implementation of a biomimetic motion, and previous studies have characterized thirteen behavioral movements with corresponding sets of average tail angle data, which we interpolated into continuous functions. The functions were compiled into Ansys Fluent and applied to a geometry modeled after a bio inspired robot, created by the lab to mimic larval zebrafish. The rectangular robot is 4 mm long and since the function prescribes the displacement of the robot, the surrounding mesh dynamically

changes each time interval. The same mesh is globally discretized and used for every motion to ensure constant spatial resolution. To quantify the transient flow, the native pressure-coupled algorithm (SIMPLE) iteratively solves for Navier-Stokes equations, given the water medium is artificially defined as incompressible with constant density. The result data including pressure and velocity at each time interval has been validated and analyzed with each corresponding larval motion. In the future, the robot's swimming locomotion will be further experimentally analyzed, as it is optimized to function as a working prototype of the larval fish with more similarity, so that it successfully interacts with its species and habitat.

Monolithic Design of a Compliant Knee Joint

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Bryan Curtin, Sahil Pitre, and Emma Joseph

Research Mentor(s): Ayse Tekes

Prosthetics remain a gigantic need in developing regions due to the increased volume of recently amputated people. The vast majority of these inflicted individuals are above the knee amputees meaning they have lost both knee and ankle in this scenario. Currently, these designs remain exceedingly expensive and unavailable in developing regions because of the vast amount of machinery used as well as being exported from first-world countries. Children remain the most in need by having to adopt the use of heavy metallic prosthetics when their bodies are not fully matured in addition to the repeated expenses of multiple prosthetics due to their growing limbs. The most vital criteria being observed in this development are the need for lightweight prosthetics for children, improved measurements to prevent buckling, and the use of a human-like gait. This study offers a passive self-actuating 3D printed compliant knee joint for children in developing regions to decrease the overall expense of above-knee prosthetics as well as increase the ease to print multiple prosthetics during their growing cycle. Compliant mechanisms are flexible links that use the material properties of the object to maximize a singular deflection into a convenient desired movement. In this compliant knee, a five-bar system is showcased to provide an adequate human-like gait. This is achieved through the use of both compliant links and a novel 3D printed approach which is more accustomed to children because of the material's lightweight. The approach of using a fully passive knee joint comes back to the decision to limit the weight of the prosthetics by removing the additional actuators. In this paper, the knee design was not only fully developed, a test bench was fabricated using similar materials that can be adopted throughout medical offices to test new limbs for these new amputated victims.

High Speed Impact on Graphene Composites

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Giovanni Espitia, Ian Durr, and Matheus Prates

Research Mentor(s): Jungkyu Park

Since the isolation of Graphene occurred in 2004, numerous studies attempting to exploit the properties of this carbon allotrope have been conducted. Graphene exists in a 2-D manner with sp^2 bonds, which

provides the allotrope with great electrical, conductive, and mechanical properties. In this paper however, we will focus on the latter in order to examine the feasibility of graphene composites for bulletproof material in the military. Pure graphene sheets count with high porosity density that leads to structural defects as well as poor mechanical properties due to physical contact being sole retainer. For this reason, the selected composite is poly(vinyl) alcohol (PVA) graphene oxide (GO). A high density of oxygen atoms causes a decrease in the modulus of elasticity within the graphene sheets. However, this constraint can be sidetracked primarily due to the presence of hydrogen bonds between the individual GO sheets that would have been nonexistent if O would have not been present. Additionally, with the aid of molecular dynamic simulations we evaluate the improved mechanical properties that resulted from the composite as well as test the effects the orientation of the individual graphene sheets has on its mechanical and structural properties.

Tensile Testing of 3D Printed Materials

Presentation - [Join now.](#)

9:40am – 9:55am

Undergraduate Student(s): Blair Cunningham and Brian Koch

Research Mentor(s): David Stollberg

In this research project, first-year students from Kennesaw State University participated in a study to find the effect of the orientation of a part fabricated with additive manufacturing, or 3D printing, on the overall part strength. At the start of this study, students were introduced to the American Society for Testing and Materials (ASTM) standard entitled “Standard Test Method for Tensile Properties of Plastics”. From here, students used Computer-Aided Design (CAD) to design test pieces according to the ASTM standard, sections D638 – 14. Both round and flat sample types were created. All of the samples were fabricated using 3D printers and polylactic acid (PLA) plastic. For the flat samples, each sample set was printed increasing 15 degree intervals of offset from the x axis, from 0 degrees to 90 degrees. The round samples were at the same interval, however the offset was relative to the z axis rather than x. Using these test pieces students were to test the specimens for tensile strength using an MTS Insight material testing machine; parameters for the tests were found in the ASTM standard D638 – 14 section 10. The testing phase consisted of using the MTS machine to gradually increase strain on the sample until it failed and broke. After testing, students were asked to interpret the data for the strain before the test piece broke. This is done by using the raw data - load and displacement - to calculate stress and strain of each sample and entering the results into a chart to illustrate the relationship between the data sets.

Performance Improvement of High Bypass Turbofan Engine Through Optimization of High-pressure Compressor Blade – A Case Study

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Vlad Mandzyuk

Research Mentor(s): Adeel Khalid

This research determines the relation between the High-Pressure Compressor (HPC) blade characteristics, compressor pressure ratio, and lift-to-drag ratio of a high bypass turbofan engine. Alterations in the HPC blades airfoil, span, chord, taper ratio, twist, aspect ratio, sweep, and angle of incidence are performed and their effect on the engine's performance is observed. The metrics used to compare engine performance include thrust, specific thrust, exit velocity, fuel/air ratio, power, and efficiency. Parametric cycle analysis and computational fluid dynamics are performed to compare and validate findings. The goal of this study is to optimize the design of HPC to maximize the engine performance.

Classroom Room Acoustics and Effect on Speech with and without Face Coverings in Direct and Reverberant Sound Fields

Presentation - [Join now.](#)

11:20am – 11:35am

Undergraduate Student(s): Danny Hernandez-Borjas

Research Mentor(s): Richard Ruhala

Prior to the COVID-19 pandemic, life consisted of seeing people in dense public areas such as malls, parks, and schools. But the life these people once knew has changed with face coverings becoming more prevalent in society along with social distancing which caused these public places to limit their capacity. However, a certain faction of society-this being students, have been affected immensely due to this transition of life at school which includes mandatory face coverings in the classroom and social distancing. This research focuses on the effects on speech with and without face coverings in a classroom setting in certain sound fields. The data used in this project comes from an acoustical Head and Torso Simulator (HATS) that acts as a sound source that generates various speech signals at various frequencies while equipped with different face coverings which include but not limited to surgical, N95, KN95, and different cloth masks. These sound levels are measured at different locations in the classroom (2.0 meters and 6.2 meters away from HATS) at octave band frequencies to then find the direct and reverberant sound fields of the classroom in Microsoft Excel; finding these fields will help reduce the room acoustical effects for students and faculty to effectively communicate in the classroom during the fallout of this pandemic. With this research, the potential outcome of knowing how to improve classroom acoustics will benefit the learning experience for the next generation of students.

Fabrication of Biomimetic Swimming Soft-Robot

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Bryan Pantoja-Villagomez

Research Mentor(s): Dal Hyung Kim

There have been few studies on the use of soft-bodied small-scale robots as there are many limitations in the locomotion of the devices. Due to the difficulty of locomotion at such a small scale, these robots are manufactured with magnetic particles and soft polymer without the use of conventional motors and sensors and are controlled entirely by electromagnets. The robot is controlled with the use of the magnetic fields generated by the 3D Helmholtz configuration. Due to the spatial limitation of the

experimental set-up, approximated Helmholtz configuration is normally used, which generates non-uniform magnetic fields across the chamber. The mapping of the magnetic fields at any location with any variation of currents in the coil sets is of utmost importance in order to ensure precise control of the robot. In this study, we fabricate a small-scale soft-robot using the 3D printer and demonstrate its locomotion. In the future, the small-scale swimming soft-robot will serve as a controllable cue for animal experiments to collect reliable and robust data autonomously. Our developed robot and control methods will play an essential role in measuring the interaction between the live subject and inorganic robot, which will help us to understand interactive behaviors in animals. There are also plans in the future to act as a counterpart to real and living larval zebrafish with an addition of a mounted camera in order to record our findings.

Mechatronics Engineering

Cooperative Localization between Robots Using Vision and Path Planning Algorithm

Presentation - [Join now.](#)

9:40am – 9:55am

Undergraduate Student(s): Charles Koduru

Research Mentor(s): Muhammad Hassan Tanveer

The aim of this article is to provide an obstacle avoidance solution for navigating a robot from one point to another. The robots that are being considered are the NAO Humanoid robot and the wheeled robot Rosbot 2.0. This article's main purpose is to understand how robots work together to minimize positioning errors. The image processing robot (NAO) will be able to instruct the wheeled bot (Rosbot) to navigate around obstacles more accurately by incorporating Inverse Perspective Mapping methods (IPM) and the A-Star Algorithm. This approach demonstrates the ability to improve robot collaboration in order to diagnose various collisions and develop various path-following methods. Despite knowing that odometry is a widely used technique for calculating robot position, it has some disadvantages in the long run. To combat this, we utilized Inverse Perspective Mapping and the A-Star algorithm to find solutions to these weak points. When IPM is used, computing the position of the obstacles in relation to the wheeled robot improves the accuracy of the path network. The path network can also be evaluated using the A-Star algorithm to find the most direct route. The appeal of this technique is that it simplifies the navigation process by analyzing data from a birds-eye perspective and computing decisions that will inform the wheeled robot to take the shortest path. A series of experiments in a static environment is used to evaluate the proposed approach's performance.

Systems & Industrial Engineering

Covid-19 Impact on the Healthcare Industry

Not presenting.

Undergraduate Student(s): Jayden Ayash

Research Mentor(s): Awatef Ergai

The coronavirus disease has had a crucial impact on almost every part of everyday life since coming into circulation in the U.S in the beginning of 2020. The healthcare industry has witnessed these changes first hand as they work to efficiently provide support for those infected and learn more about the virus. This study investigates how different work factors such as shifts worked, type of daily exposure to the virus, and homelife impact worker's overall risk perception of the virus. Four hundred and forty healthcare workers were surveyed and data was collected about their occupation, daily work conditions, risk perception, and concern level about the virus. Work conditions were compared to risk perception in excel in order to determine how different factors either raise or lower the worker's risk perception. Initial results suggest that 1) healthcare workers who have spouses and children indicated a higher risk perception of contracting the virus than those who lived alone; 2) workers who witnessed Covid-19 effect friends, family, or co-workers marked a higher level of risk perception; 3) the majority of workers who dealt with direct exposure of the virus indicated a higher risk perception than those who worked with indirect exposure. These results suggest that there are several other factors other than just the virus that impact worker's risk perception about the virus. The outcome of this study will be used to assist healthcare systems in establishing customized interventions to reduce stress levels on healthcare professionals.

Sound, Material and Strength Correlation

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Ryan McBride

Research Mentor(s): Randy Emert

With a growing amount of manufacturing utilizing 3D printing, there is a correlation between strength and material which can affect sound produced by sirens. An air raid siren that has been downloaded from Thingiverse.com spins with a 49:1 gear ratio to produce 2 tone sounds and with that large number of revolutions comes friction, and in order to create a 3D printed air raid siren, the siren must be made out of a material that can withstand high temperatures without melting and quick rotations without delaminating. There are many materials that can be printed to withstand those forces, but it comes at a cost. In order to maximize sound at the cheapest price there will be different materials for different components depending on the need for heat resistance or strength. With the combination of five materials: PLA, ABS, PETG, PC ISO and ULTEM 9085, the 3D printed air raid siren will be able to maximize sound output without melting or breaking from the extreme forces.

Wellstar College of Health and Human Services

Exercise Science & Sport Management

Recovery of Peak Torque after Fatiguing Explosive and Slow Maximal Muscle Contractions: Preliminary Findings

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Michael Cooper and Jaqueline Roman-Soto

Graduate Student(s): Benjamin Dalton, Michaela Alesi, and Jacob McDougle

Research Mentor(s): Trisha VanDusseldorp, Robert Buresh, Yuri Feito, and Garrett Hester

The unique neuromuscular strategies for explosive and slow muscle contractions may result in differing rates of recovery for peak muscle torque (PT) upon cessation of fatiguing exercise involving these contraction types. PURPOSE: The purpose of this study was to examine the recovery of PT after explosive and slow fatiguing muscle contractions. METHODS: Following a familiarization visit, recreationally active males (n=4, age=23.3±2.2 years) were randomly assigned to perform fatiguing exercise consisting of either explosive (RAPID) or slow (RAMP) maximal voluntary isometric contractions (MVICs) on separate visits. Each protocol consisted of repeated 5 s MVICs of the quadriceps, with an explosive intent (“kick out as hard and fast as possible”) being emphasized during RAPID and RAMP involving a 2 s ramp-up during MVIC initiation. Two MVICs were performed before, immediately after, and 2, 6, and 12 min following the protocols to assess recovery. The Friedman test and relative increases (% of baseline) were used to assess recovery of PT after both protocols. RESULTS: Following a similar magnitude of fatigue (–33% vs. –28%), no differences were noted throughout recovery for either condition (p>0.05). Relative increases after RAPID were 79%, 84%, and 89% at 2, 6, and 12 min, respectively. Relative increases after RAMP were 82%, 87%, and 95% at 2, 6, and 12 min, respectively. CONCLUSIONS: Although preliminary, our data suggest that recovery of muscular strength (i.e., PT) is similar after explosive and slow fatiguing muscle contraction.

Effects of Explosive and Slow Fatiguing Muscle Contractions on Maximal and Rapid Torque Production: Preliminary Findings

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): Michael Cooper and Jaqueline Roman-Soto

Graduate Student(s): Benjamin Dalton, Michaela Alesi, and Jacob McDougle

Research Mentor(s): Trisha VanDusseldorp, Robert Buresh, Yuri Feito, and Garrett Hester

Given the unique neuromuscular strategies involved in explosive and slow muscle contractions, fatigue-related changes in maximal and rapid muscle torque production for these contraction types may differ. PURPOSE: To determine the response of maximal and rapid torque production after explosive and slow fatiguing muscle contractions. METHODS: Recreationally active males (n=5, age =23.3±2.2 yrs) were randomly assigned to perform fatiguing exercise consisting of either explosive (RAPID) or slow (RAMP) maximal voluntary isometric contractions (MVICs) on separate visits. Each fatigue protocol consisted of repeated 5 s MVICs of the quadriceps, with an explosive intent (“kick out as hard and fast as possible”) being emphasized during RAPID and RAMP involving a 2 s ramp-up during MVIC initiation. Two MVICs were performed before and immediately after each protocol to assess peak muscle torque (PT) and rate of muscle torque development (RTD) at different time intervals. RTD was calculated as the linear slope of the torque-time curve from contraction onset to 50 (RTD0-50; early RTD) and 200 (RTD0-200) ms, and from 100 to 200 ms (RTD100-200; late RTD). Wilcoxon signed rank test and relative changes (% decrease from baseline) were used to evaluate fatigue-related changes between

protocols. **RESULTS:** Reductions in PT (−35%), RTD0-50 (−59%), RTD100-200 (−37%), and RTD0-200 (−44%) were demonstrated after RAMP ($p=0.043$ for each). In contrast, PT was decreased after RAPID ($p=0.043$; −30%), but not RTD0-50 ($p=0.686$; −21%), RTD100-200 ($p=0.225$; −15%), or RTD0-200 ($p=0.345$; −25%). **CONCLUSIONS:** Although preliminary and bearing in mind our small sample size, these data suggest that explosive torque production (i.e., RTD) is diminished more after fatiguing exercise involving slow contractions compared to explosive contractions. Early RTD was particularly reduced after slow contractions which may reflect a reduction in rapid muscle activation.

The Relationship Between Self-Reported Exercise Prior to Pregnancy, GDM, and Neonatal Birth Weight

Presentation - [Join now.](#)

12:20pm – 12:35pm

Undergraduate Student(s): Maria Johnson and Raine Morris

Research Mentor(s): Juliana Meireles, Janeen Amason, and Katherine H. Ingram

Background: Gestational Diabetes Mellitus (GDM) is associated with an excessive infant birth weight, and sedentary women are at a higher risk for GDM. The objective of this project is to assess the relationship between exercise prior to pregnancy, GDM, and neonatal weight. *Methods:* Through social media, women with children ages two years or less were recruited to answer an online questionnaire regarding physical exercise prior to pregnancy based on frequency (none, occasionally, few times a week, or most days of the week) and intensity (high, moderate and light). GDM diagnosis during pregnancy was self-reported. An exercise intensity score was calculated using the following formula: the high intensity is multiplied by 3, moderate intensity by 2 factor and light intensity by 1, then summed together. Bivariate statistical analyses were performed to verify the correlation using SPSS 27.0. *Results:* Women ($n=240$) aged 22 to 47 years ($M= 32.99\pm 4.63$) with 6.2% indicating a GDM diagnosis ($n=15$). The average birthweight for the GDM group was 3.14 ± 0.43 kg, and the birthweight for the non-GDM group was 3.18 ± 0.59 kg. There was no correlation between exercise before pregnancy and birth weight ($\rho=0.06$, $p=0.370$). Out of the 15 women with GDM, 12 (80%) exercised prior to pregnancy while 3(20%) women did not exercise. Of the women without GDM, 91.55% ($n=206$) reported exercise prior pregnancy, while 8.45% ($n=19$) of these women reported no exercise There was no significant difference between exercise prior to pregnancy and GDM ($U=960.5$, $p=0.755$). *Conclusion:* No significant differences were found between the self-reported level of physical exercise prior to pregnancy between women with and without GDM. In addition, the level of exercise was not correlated with birth weight. Although our data does not demonstrate a correlation between self-reported exercise levels prior to pregnancy and GDM, it is well-established that exercise is an important factor for a healthy pregnancy.

Exercise Level during Pregnancy, Gestational Diabetes and Baby Birthweight: A Quantitative Retrospective Study

Presentation - [Join now.](#)

9:40am – 9:55am

Undergraduate Student(s): Haley Wright, Ami Eho, and Raine Morris

Research Mentor(s): Katherine H. Ingram, Janeen Amason, Juliana Filgueiras Meireles, and Nicole Carlson (Emory University)

Background: Gestational diabetes mellitus (GDM) is a cardio-metabolic health condition found in 2-10% of pregnancies in the United States each year. This condition can lead to an increase risk of gestational preeclampsia and future type 2 diabetes in mothers. GDM also increases the risk of obesity and type 2 diabetes in offspring. Studies showed that exercise reduces the risk of GDM and stimulates healthy growth for the fetus. Objective: This study aims to evaluate the relationship among exercise level during pregnancy, GDM and birthweight. Methods: A survey was shared through social media with women who have given birth within the past two years. Participants were asked to share information regarding their pregnancy exercise frequency and intensity, health conditions such as GDM, and birthweight. Data was analyzed by SPSS 27.0, and bivariate statistical analyses were performed. Results: Women (n=240) were between the ages 22-47 (Average = 32.99±4.63) and 6.25% (n=15) were diagnosed with GDM. The average birthweight for the GDM group was 3.14 ±0.43 kg, and the average birthweight among the non-GDM group was 3.18 ±0.59 kg. Of the women with GDM, 77.33% (n=11) reported exercise during pregnancy, while 26.67% (n=4) of these women reported no exercise. 82.22% (n=185) of women without GDM reported exercise during pregnancy, and 17.77% (n=40) reported no exercise. No correlation was found between exercise level during pregnancy and birthweight ($r=-0.56$, $p=0.464$). Exercise level during pregnancy and GDM also presented no significant differences ($U=737.00$, $p=0.533$). Conclusion: Our study shows limited evidence that self-reported exercise is associated with reduced risk for GDM. However, other studies have shown a benefit of exercise on risk for GDM. These conflicting findings confirm that more research is needed to better understand influences of exercise during pregnancy on maternal and neonatal outcomes.

Health Promotion & Physical Fitness

Exploring the Role of Schools in Mandatory Fitness Assessments of Students in Georgia

Presentation - [Join now.](#)

9:40am – 9:55am

Undergraduate Student(s): Catherine Akins

Research Mentor(s): Phaedra Corso

With childhood obesity rates on the rise, many states have turned to mandatory school-based physical education policies. In Georgia Student Health and Physical Education (SHAPE) Act was passed in 2009, which requires all public-school students K-12 to increase physical education in schools weekly, and to participate in an annual physical assessment. The purpose of this study is to examine the perception of PE teachers and Principals regarding this Georgia policy. Data was collected through face-to-face structured interviews with PE teachers (and principals) from 82 Georgia middle schools that have implemented the SHAPE policy impact, change in physical activity priority, and the PE teachers' overall opinions of the policy. All interviews were audiotaped, transcribed, and coded using best practices for qualitative data analysis. These interviews analyzed using NVivo 12, a qualitative data analysis software. The results from the analysis show the frequency of PE teachers' perceptions of

Georgia's SHAPE policy in the following main themes: priority, involvement, opinions, and impact. Overall, the perception of PE teachers, regarding the impact, was positive but subtle variation in perception occurred based on specific school characteristics.

Cardiovascular Health (CVH) Status among KSU Students: Implications for Campus-wide CVH Promotion

Not Presenting.

Undergraduate Student(s): Tyler Robertson

Research Mentor(s): Ping Johnson

Cardiovascular diseases (CVD) has been the leading causes of death in the US and include coronary heart disease, stroke, deep vein thrombosis, rheumatic heart disease, to name a few. Most CVD cases occur in individuals with various levels of risk factors. In order to cut down on the risk of CVD and improve cardiovascular health (CVH), the American Heart Association (AHA) proposed seven metrics. Each of these metrics has recommended levels of each which help maintain CVH, and to aid those with prior conditions to achieve longer healthier lives. KSU has collected data on the priority health behaviors from students every two years since 2010, including four CVH metrics: not smoking, healthy body weight, physically active, and healthy diets. Those data show a positive non-smoking trend from 2010-2018 (60 to 77.7%) with a slight reversal to 67.4% in 2020. Students who met the recommended moderate to vigorous exercises increased from 40-48% in 2010-2018 to 66% in 2020. Normal body mass index was seen among slightly over 50% of the students between 2010-2018, with a slight dip to 49.3% in 2020. Students who had at least 3 servings of fruits and/or vegetables fluctuated around 30% between 2010 and 2018 but dropped to 18.4% in 2020. Results reveal that a large proportion of KSU students have engaged one or more behaviors that put them at risk for CVD. While some of the numbers shown positive changes in student activities, exposure and ease of access along with peer pressure and stress can run the risk of students engaging in these risky lifestyles. Healthier food options and restrictions, more readily available groups and classes to maintain a healthier body weight along with exercising groups who provide motivation, and smoking restrictions, can all add to an increase in a healthier lifestyle for those at KSU.

Cognitive Decline in a Social Context: Have We Done It to Ourselves?

Presentation - [Join now.](#)

1:00pm – 1:15pm

Undergraduate Student(s): David Posada

Research Mentor(s): Mari-Amanda Dyal

Background and Research Question/Purpose of Research: There has been much discussion about cognitive decline in older individuals as a result of the natural aging process. These discussions have been focused on memory, attention, and executive function. Moreover, these discussions have, to some degree, captured social cognition and interaction as a preventive factor in overall cognitive decline. However, social cognition and interaction as a preventive factor have primarily been discussed in the traditional sense ignoring the presence and impact of the digital experience. Research Methods: The current research seeks to review the state of the literature to determine to what extent social cognition

and interaction in the digital domain impacts cognitive decline. More specifically, does social cognition and interaction retain its protective nature against cognitive decline in digital environments, or has it become a risk factor? Given the uptick of social media in the past decade and virtual communication during the pandemic, the social context has changed, and its impact on cognitive decline may have as well. All age brackets will be included in the review in order to determine rather than assume vulnerable populations. The review of literature will require accessing several databases to ensure that the related literature, specifically primary sources of data, are reviewed to the fullest extent possible, such as PubMed, CINAHL, Web of Science, and PsychINFO. Keyword generation will include select terms to capture the breadth and depth of the areas of interest: cognitive decline, social cognition, social interaction, digital age, social media, pandemic, risk factor, and protective factor. Results/Findings (completed or expected if work is still in progress): A comprehensive review will reveal the state of the literature as it relates to the research question. It is hypothesized that there are critical gaps in the understanding of social cognition and interaction in the digital age as a protective factor against cognitive decline. Conclusions & Implications for future research, if applicable: The review will inform future practice and research recommendations to 1) better understand cognitive decline in the social context that currently has very strong digital roots and 2) guide best practices and research priorities to reduce risk and strengthen what protective properties still exist.

Workplace Health Promotion (WHP) and Retirement Readiness: A Programming Possibility?

Not presenting.

Undergraduate Student(s): Havan Temesghen

Research Mentor(s): Mari-Amanda Dyal

Background and Research Question/Purpose of Research: Retirement readiness and transition have historically been within the domain of human resources, as well they should be when discussions of pension and insurance are considered. However, there is more to retirement readiness and transition. That is, the mental preparation required to take the next step that many individuals delay. There are many reasons for retirement delays, but the number one reason has been linked to loss of purpose and sense of belonging, which lends itself to workplace health promotion (WHP) programming that could assist with readiness and transition. WHP programming is very comprehensive in nature, and readiness and transition programs for retirees could 1) build their self-efficacy, 2) provide a sense of fulfillment with health-related goals, and 3) instill connectedness through a retiree network and external retirement services. Granted, WHP funds should be used for active employees; however, retirement delays can impact the economy and workforce in negative ways. Research Methods: Therefore, a comprehensive review of WHP programming and policy (in various industries) related to retirement readiness and transition will be conducted to ascertain the feasibility, interest, and true necessity of program development in this regard. Results/Findings (completed or expected if work is still in progress): It is hypothesized that there are critical gaps in WHP programming and policies as they relate to retirement readiness and transition, and a combined review of these specific sources will provide a comprehensive status check on the current gaps and opportunities for WHP intervention that could have many individual and organizational implications. Conclusions & Implications for future research, if applicable: The findings of this review will inform research recommendations and practical implications

for employers and employees for consideration and incorporation that could add value at both the individual and organizational levels.

Nursing

Pain Management During Chest Tube Removal in Cardiac Post-op Patients

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Megan Koblitz, Caitlin Cooney, Isa Keller, and Kayla Mezosi

Research Mentor(s): Mary Dioise Ramos

Chest tube insertion, or chest tube thoracostomy, is a medical procedure performed to remove air, blood, or fluid from the pleural cavity to restore lung function. Chest tube removal generally takes place within 24 to 48 hours postoperatively while the patient is conscious; thus, making it a relatively painful experience. Due to a lack of evidence, few known procedures effectively manage pain associated with chest tube removal. Objective: This study aims to explore and analyze existing research related to pain management, including pharmacological and non-pharmacological methods during chest tube removal, in post-operative cardiac patients to institute new and effective methods into current medical practice. Methods: A systematic literature review was conducted to obtain relative data guided by a PICOT question and organized using a PRISMA flow chart and a search strategy technique. A total of 150 articles were narrowed down to five articles, each related to pain management of chest tube removal and were conducted within the past five years. Conclusion: Interventions including continuing education of nurses, cryotherapy, music therapy, transcutaneous nerve stimulation, and therapeutic nerve blocks may contribute to or have an adjuvant role in alleviating pain associated with chest tube removal.

Effects of Pregnancy on Women's Mental Health and Wellbeing

Presentation – [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Sarah Muh, Hannah Reining, and Raina Davis

Research Mentor(s): Mary Dioise Ramos

Background: Women who experience pregnancy undergo numerous changes. These changes range from physical to mental and many more. However, there has been extensive research on how the woman's body changes and develops before pregnancy, during, and even post-pregnancy, yet there is not as extensive an understanding of how the woman's mental health is affected by pregnancy. Objective: The aim of this systematic review was to answer the question "How pregnant women perceive their mental health changed throughout pregnancy and post-partum?" Previous research was conducted on the understanding of how pregnancy affects pregnant women's mental health and wellbeing throughout and post-pregnancy. Postpartum depression is a term prevalently heard, yet that does not explain the range of mental health changes that occur post pregnancy. Method: Search of the bibliographic databases

PubMed, Proquest, CINAHL was done to analyze longitudinal studies on the effects of pregnancy on mental health published from 2015-2021. Result: Pregnancy impacts women's mental health whilst also raising hormone levels that are associated with productivity, positive, and happiness. Conclusion: Greater understanding of what is occurring to women's mental health post-pregnancy, treatments and support programs can be created and implemented to possibly improve the mental wellbeing of both mother and child.

Impact of Cognitive Behavioral Therapy and Selective Serotonin Reuptake Inhibitor to Post Traumatic Stress Disorder among Veterans: A Systematic Review

Presentation - [Join now.](#)

9:40am – 9:55am

Undergraduate Student(s): Madison Armstrong, Emma Conley, and Mary Kate Eaton

Research Mentor(s): Mary Dioise Ramos

Background: Depressive and anxiety symptoms are common side effects among patients with Post Traumatic Stress Disorder (PTSD), and interventions have only been moderately successful in reducing these side effects. Determining the most effective intervention to help veterans cope with symptoms pertaining to PTSD need to be identified. Methods: A systematic review of literature was conducted to answer the question "In veterans with PTSD, how does Cognitive Behavioral Therapy (CBT) compare to Selective Serotonin Reuptake Inhibitor (SSRI) drug therapy influence anxiety and depressive symptoms?" Search of the bibliographic databases EBSCOHost, Cochrane, and PubMed were used to identify studies published between 2015-2020 that studied the progression of PTSD specifically in veterans and the benefits of CBT and SSRI. Results: There are evidence to support the impact of CBT and SSRI to the veteran's quality of life and the reduction of depressive and anxiety symptoms. Conclusion: Patient centered therapy (PCT), a type of CBT was found to be more effective than basic CBT.

The Effect of Alternative and Personalized Therapy in the Treatment of Depression in Older Adults Living in Long-Term Care Facilities

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Amber Davis, Olivia Gilbert, Kayla Kelley, Mitch Elliot, and Deanna Hebert

Research Mentor(s): Jenna Shackelford

Background: In older adults, depression can lead to changes in memory, physical pain, fatigue, sleep disturbances, and even suicidal ideations. Due to the shortage of healthcare workers in long-term care facilities, older adults have a difficult time receiving treatment. Therefore, alternative treatment methods and personalized therapy are becoming more important when treating patients in long-term care facilities. Objectives: This systematic review set out to determine whether personalized therapy and alternative treatment methods may significantly reduce the symptoms of depression and improve the overall quality of life in older patients living in long-term care facilities. Method: An electronic search was conducted using CINAHL and PubMed databases to gather studies eligible and relevant to our

topic. The search included specific keywords such as “depression OR depressive disorder”, “geriatric OR elderly OR 65+ years old”, “alternative therapies OR alternative treatment OR complementary therapy OR therapy”, and “long-term care OR nursing home OR residential care OR assisted living”. Six relevant articles were screened, evaluated, and included in the final systematic review. Results: Following an assessment and evaluation of the six studies, implementing treatments such as laughter therapy, music therapy, the Positive Mood and Active Life Program, and The BRIGHTEN Program demonstrated a reduction in depressive symptoms and improvement in the quality of life of elderly patients residing in long-term care facilities. Conclusion: Implementation of personalized therapy and alternative treatment programs showed a significant reduction in the prevalence of depression in patients living in long-term care facilities.

A Systematic Review: The Impact of Social Support Programs on Caregiver Burnout for Caregivers of Children with Cancer

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Vanessa Otamendi, Jalaya Graves, Autumn Whitley, Joanna Juarez, and Helena Walker

Research Mentor(s): Jenna Shackelford

Background: In addition to children diagnosed with cancer, their caregivers may also experience hardship. While caregivers handle their own personal responsibilities, they also provide emotional, physical, and financial support to their children. In addition to the likely stress that occurs from caring for a child with a long-term illness, lack of social support, educational resources, or support programs may lead to caregiver burnout. Objective: The purpose of the systematic review was to review published research focused on caregiver burnout for caregivers of children diagnosed with cancer and the impact of social support programs on caregiver burnout. Methods: A systematic literature review was conducted using PubMed and CINAHL databases to search for peer-reviewed journal articles that were published between 2011 and 2021. Inclusion and exclusion criteria were used to screen studies using specific keywords such as “caregiver”, “burnout”, “children with cancer”, “childhood cancer”, “social support program”, and “therapy”. Relevant articles were assessed and evaluated for the highest quality to include in the final review. Results: Eight articles were chosen and assessed from the initial search. Interventions such as family therapy, internet-based self-help, acceptance and commitment therapy (ACT), promoting resilience in stress management for parents (PRISM-P), and religious participation demonstrated improvement in decreasing caregiver burnout for caregivers of children with cancer. Conclusion: Social support, educational resources, and support programs may decrease the level of burnout for caregivers as they care for their children compared to caregivers with a lack of support.

A Systematic Review: The Impacts of Non-Pharmacological Therapy Interventions, Such as Exercise, on Postpartum Depressive Symptoms in Postpartum Women?

Presentation - [Join now.](#)

12:00pm – 12:15pm

Undergraduate Student(s): Jennifer Rafala, Amanda Kozlowski, Kristin Simons, Madison Rhoad, and Courtney Greene
Research Mentor(s): Jenna Shackelford

Background: Postpartum depression is a psychological condition most often seen within six weeks after birth. Often confused with short-term “baby blues”, postpartum depression can be debilitating including excessive crying, insomnia, fatigue, feelings of hopelessness and worthlessness, and other disruptive symptoms that can impede the new mother’s ability to care for herself and her baby. Postpartum depression often goes unrecognized by new mothers; however, when diagnosed, treatment regimens frequently include pharmacological interventions. Objectives: This systematic review aimed to determine the effectiveness of nonpharmacological therapies, such as exercise regimens, in the treatment of postpartum depression. Method: An electronic search on the nursing and allied health databases PubMed and CINAHL were used to identify eligible studies. Studies were systematically retrieved using a search strategy with specific inclusion and exclusion criteria and combined phrases such as “postpartum depression” and “treatment” and “exercise”. After full analysis and appraisal of the research, five studies were included in the final review. Results: The Edinburgh Postnatal Depression Scale (EPDS) was commonly used to measure the level of depression in postpartum mothers. Findings suggested that pregnant mothers who were not exercising prior to pregnancy but initiated an exercise regimen after birth had improved EPDS scores, or lower levels of depression. However, EPDS scores did not change for women who participated in exercise regimens both before and after pregnancy. Conclusion: Overall, this systematic review demonstrates that initiating non-pharmacological interventions, such as exercise regimens, may improve levels of postpartum depression in postpartum women.

How Various Exercise Modalities Impact Quality of Life, Physical Activity, and Program Adherence in Patients with COPD

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Hannah Brookshire, Sarah Barnes, Natalie Cagle, Nancy Starnes, and Elia Schaefer
Research Mentor(s): Jenna Shackelford

Background: Chronic obstructive pulmonary disease (COPD) is a group of diseases that causes breathing difficulty due to airway obstruction. Adherence to physical activity recommendations for those with COPD is often problematic and leads to worsening dyspnea and quality of life. Due to the prevalence of COPD, it is important to understand how different exercise modalities impact quality of life and adherence to physical activity. Objective: The purpose of this systematic review was to determine if patients with COPD have a better quality of life and adherence to physical activity recommendations if they follow exercise modalities. Method: Research was conducted using the databases PubMed and CINAHL. Search terms included “exercise interventions”, “COPD”, “quality of life”, and “physical activity”. 169 studies were systematically retrieved and reviewed. After full analysis and appraisal, eight studies were included in the final review. Results: Several different exercise modalities were used in the studies and results were collected using different research instruments. St.

George's Respiratory Questionnaire, 6-Minute Walk Test, CAT scores, daily step counts, and other pulmonary function tests were used to collect data before, during, and after the exercise programs were conducted. The results demonstrated that different exercise modalities improve quality of life and adherence to physical activity recommendations in patients with COPD. Conclusion: The systematic review demonstrates that patients with COPD who are physically active and regularly adhere to exercise regimens have a healthier and improved life. Research supports that exercise has a direct effect on quality of life for patients with COPD.

Preeclampsia in African America Women

Presentation - [Join now.](#)

1:20pm – 1:35pm

Undergraduate Student(s): Breanna Shoultz, Qweita Eastman, Taylor Maynor, and Konstanz Ewing

Research Mentor(s): Mary Dioise Ramos

Background: Every year in the U.S., there are 700 pregnancy related deaths that occur, with ⅓ of those deaths being preventable. African American women are 3-4% more likely to die of pregnancy related complications, mainly preeclampsia, than any other population. Preeclampsia is related to cardiovascular diseases such as high blood pressure, which Black women are more at risk for. Objective: This systematic review will explore how preventative techniques such as the use of diuretics and physical activity during pregnancy will decrease the risk for preeclampsia in African American women compared to untreated preeclampsia complications that affect mortality rates upon delivery. Method: Search of the bibliographic databases EBSCOHost, Proquest, and CINAHL were used to identify studies published in the last five years to identify eligible studies. Data were analyzed from the 36 studies. Results: Results yield the conclusion that combined exercise, diuretics, along with prenatal care are preeclampsia prevention techniques that decrease mortality rates among African American women upon delivery when compared to their counterparts. Conclusion: Overall, we are exploring how these preventative techniques are shown to be effective in decreasing maternal mortality rates in African American women individually or as a combination therapy in comparison to those who do not.

How Do Veterans with Limb Amputation Perceive Health-Related Quality of Life?

Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Alyssa Bedenbaugh, Kaylin Woodring, and Aynur Asgarova

Research Mentor(s): Mary Dioise Ramos

Background: The quality of life is diminished among veterans with limb amputation. Affecting factors include phantom pain, level of amputation, PTSD, and drug usage. Consequences of not acknowledging affecting factors government expenses, increased unemployment, low mental health, and other life obstacles. If this problem continues to go unaddressed, the rate of unemployment will rise, and mental health and quality of life for veterans will decline at even faster rates. Objective: This systematic review aimed to explore the perception of health-related quality of life among veterans with limb amputation.

Method: The systematic review was done by using CINAHL, EBSCOHost, PubMed, Google Scholar, Clinicaltrials.gov, and Cochrane centrals databases to identify eligible studies. Results: Data was analyzed from the 86 articles included in the study. According to the articles, veterans with limb amputations perceive their health-related quality of life to be poor. This is due to many being unable to work and financially support themselves, phantom limb pain and the difficult physical rehabilitation, and the psychological stress of knowing they can no longer do activities they once could, these being the most popular beliefs. Conclusion: The perception of health-related quality of life for veterans with limb amputations is less than a non-veteran with no limb amputation(s).

Methods Leading to Best Outcomes for Elderly Patients Presenting with Chest Pain in Emergency Departments.

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Philip Choo, Seth Bristol, Jacob Sharer, and Hannah Wilson

Research Mentor(s): Mary Dioise Ramos

Background: Hospitals today currently face many health disparities among patients. There are many factors that contribute to these health disparities such as the decision-making process. Objective: The goal of this systematic review was to identify how computerized risk prediction models compared to a set of decision rules influence health outcomes during emergency room stay of older adult patients with chest pain. Method: We searched databases such as, CINAHL, EBSCOHost, and PubMed to identify barriers influencing health outcomes of older adults with chest pain in the emergency department. Results: There were seven articles included in the review indicating the effectiveness and reduction of the delay in the management of chest pain among older adult patients in the emergency room when decision making models are available. Conclusion: With the use of a computerized risk prediction for elderly patients with chest pain proved to be more reliable and effective with time and treatment.

Effects of Insulin Delivery Pumps on Diabetic Adherence to Treatment in Children and Adolescents

Presentation - [Join now.](#)

4:40pm – 4:55pm

Undergraduate Student(s): Bailey Brott, Aubrey Crawford, Kynley Swain, Ally Williams, and Virattana Phavorachit

Research Mentor(s): Jenna Shackleford

Background: Diabetes Mellitus (DM) is a chronic disease characterized by the inability of the body to create and release its own insulin to lower blood sugar. Automatic insulin delivery pumps are a substitute for glucose finger sticks and multiple daily injections to treat DM. These pumps measure patients' glucose levels and administer insulin as needed which may lead to better overall treatment adherence for children and adolescents diagnosed with DM. Objective: This systematic review aimed to compare the effectiveness of insulin pumps on increased adherence to treatment in children and adolescents diagnosed with DM. Methods: A systematic literature review was conducted using the online databases PubMed and CINAHL to identify relevant studies. Articles were chosen using distinct inclusion and exclusion criteria. In total, six articles were retrieved and examined using this search

strategy. Results: Results from these studies showed an overall higher adherence to treatment in children and adolescents who used insulin pumps compared to those who used multiple daily injections. In addition, patients overall had better control of their diabetes while utilizing an insulin pump. However, one study revealed that adolescents using insulin pumps had a slight decline in treatment adherence due to increased age and newfound independence from parental assistance. Conclusion: Most studies found the use of insulin pumps led to an increased adherence to treatment for children compared to patients who use multiple daily injections and blood glucose strips; however, adolescents who used insulin pumps demonstrated a decline in overall treatment adherence. These results reveal a need for further research on individual factors influencing adherence to treatment for children and adolescents with DM.

A Systematic Review: The Effect of Social Support on Emotional Burden of Alzheimer's Caregivers

Presentation - [Join now.](#)

4:20pm – 4:35pm

Undergraduate Student(s): Jessica Monahan, Julia Samuel, Guadalupe Perez, Cristiana Seixas, and Adanech Jones

Research Mentor(s): Jenna Shackelford

Background: Alzheimer's disease is a degenerative form of dementia that affects not only patients but also their caregivers. Various social support interventions have been shown to benefit caregivers by decreasing stress, depression, anxiety, and other physical and psychological issues. Objective: The purpose of the systematic review was to determine the effect of social support on emotional burden for caregivers of patients with Alzheimer's disease. Methods: Research was conducted using the databases PubMed and CINAHL to identify eligible studies. Specific inclusion and exclusion criteria were used when screening studies. After evaluation and assessment of the studies, a total of eight articles (randomized control trials, cross-sectional and longitudinal studies, and mixed method studies) were included in the final systematic review. Results: Social support and emotional burden were measured using various social support mechanisms (CBI, CCSM, IADCQ, PAC, REACH, SSRS) and anxiety and depression scales (CES-D, SAS, SDS). Results demonstrated that the majority of studies demonstrated a significant decrease in caregiver depression and burden after implementation of various social support interventions, such as social support groups and customized educational sessions. Conclusion: Overall, this systematic review demonstrated that social support interventions may decrease depression and emotional burden for caregivers of patients with Alzheimer's disease.

Social Work & Human Services

Exploring the Current Gaps in Service Provision for Victims of Human Trafficking

Presentation - [Join now.](#)

3:40pm – 3:55pm

Undergraduate Student(s): Brianna Zambo

Research Mentor(s): Darlene Xiomara Rodriguez

Over the years, human trafficking has become a very prevalent global issue that has affected all facets of a victim's life and the world they live in. It impacts all people no matter their race, gender, age, religion, or ethnicity. Essentially, human trafficking has been characterized as a form of modern day slavery. While all peoples are affected by the atrocities of human trafficking, a majority of the research and resources are provided for minors leaving little research or resources for services for adults. Hence, the need for research that focuses primarily on services for adult victims of human trafficking. Furthermore, the research seeks to identify the needs for victim care services through evaluating current programs and barriers to service to adult victims. Data will be collected through a combination of qualitative and quantitative research including data from peer-reviewed scholarly articles, journals, graphs, charts, program descriptions and theoretical models. Conclusions will include trends and barriers regarding key areas such as victim indicators and risk factors, housing, public awareness, community training, victim care services (both short and long term) in order to provide recommendations and implications for best practices for future research and work within the nonprofit sector.

Teenage Pregnancy in the United Kingdom, Sweden and the USA

Presentation - [Join now.](#)

12:40pm – 12:55pm

Undergraduate Student(s): Erica Mullis

Research Mentor(s): Hans Skott-Myhre

The purpose of this analysis is to determine why the United States has the highest teen pregnancy rate in relation to many developed countries (Florescu et al., 2016, p. 84). Teenage pregnancy can be viewed as a pandemic. It not only effects the mother's lives (many which end up raising their child by themselves), but it directly effects the economy. Teenage mothers end up on welfare at much higher rates than any other group. Throughout this paper, I have conducted a thematic analysis. I have compared factors from Sweden, The United Kingdom, and The United States. These factors include country profiles, school health policies, human development, sexual education programs, and factors that affect the economic status of the contrasting countries. This analysis concludes the fact that political ideology and sexual education programs greatly impact the teenage pregnancy rate. The United States sexual education program of abstinence is greatly influence by political ideology.

Improving Social Responsibility in a Young Adult with Bipolar Disorder through Cognitive Behavior Therapy and Medication Compliance

Presentation - [Join now.](#)

4:20pm – 4:35pm

Graduate Student(s): Dashawna Anderson, KaTerra Johnson, and Katherine Moore

Research Mentor(s): James B. Stinchcomb

Through a social work clinical perspective, working with individuals who have been noncompliant with therapy and regularly taking medication as prescribed can lead to a serious inability to function day to day in society. This single case study design focuses on an individual with Bipolar Disorder who is struggling to reacclimate after being diagnosed. It's important to note the client in this case study is

based on a fictional character. All results are based on best practices and situations of real cases with someone who complies with given interventions. Bipolar Disorder (BP) is a fairly common, lifelong mental illness that causes a shift in mood, energy, and daily function; 1 in every 100 people will be diagnosed with BP at some point in their lifespan. BP I includes severe manic and depressive episodes, whereas BP-II includes alternating depressive and manic episodes that are less severe. Recent literature suggests that clients should receive medication supplements and psychoeducation to combat the symptoms of BP. Using evidence-based best practices, this study focuses on a biopsychosocial-spiritual assessment (BPSS) conducted with a 27-year-old female diagnosed with BP I who has trouble maintaining employment. After meeting with the client, it was hypothesized that Cognitive Behavioral Therapy (CBT) combined with a thorough medication treatment plan will help to stabilize the client's BP. This was measured by the client's journaling, mood scale, and medication app. The results showed that CBT along with compliance to medication allowed the client's mood to stabilize thus sustain employment.

How We Fail US Foreign-Born Veterans: A Scoping Study of the Literature

Presentation - [Join now.](#)

12:00pm – 12:15am

Graduate Student(s): Eric Manley

Research Mentor(s): Darlene Xiomara Rodriguez

Many foreign-born US service members have taken advantage of expedited naturalization provisions for them to obtain US citizenship through military service. However, while citizenship was almost automatic for veterans in centuries past, today this is more difficult to achieve, and some veterans may even be at risk of deportation because they did not or were not able to naturalize. This scoping study synthesizes academic articles and grey literature, focusing on data, naturalization laws, and executive orders that have an impact on foreign-born veterans and foreign-born service members alike. This group has sacrificed much like their native-born veteran counterparts, yet do not always receive the same honor as them. Findings indicate a need for more research to drive policy that would address the country's significant debt to its foreign-born veterans.

Why Should You Care?

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Shandia Sinclair-Childress

Research Mentor(s): Darlene Xiomara Rodriguez

The question everyone asks is why should I care? There are so many different people and organizations that have an ask of the public. Using a qualitative exploration of published literature, I will be able to demonstrate how nonprofit organizations can entice the millennial generation to care. So why Millennials? “Millennials are the largest generation in American history, surpassing their Baby Boomer parents by 17 million. They are 95 million strong, more affluent, better educated, and more ethnically diverse”. This led to my research question why nonprofits should use social media to inspire social activism in Millennials. The best way to market to Millennials is using social media because it is a tool

they understand and connect with. Millennials' usage of social media and how they feel about it was evident in the research. Conclusion reveal how social media is an important tool for social activism among Millennials. Also, why they should be the focus when an organization desires to engage others in social activism. There are limitations on the size of the data collected. Few studies were only able to gather data from one location or was only able to gather data from 100 individuals in the millennial's age range. Further research should use a quantitative method to expand the parameters of this subject.

Use of Long-Term Weight Loss Programs in Conjunction with the Diabetes Prevention Program

Presentation - [Join now.](#)

10:40am – 10:55am

Graduate Student(s): Martha Nimmo

Research Mentor(s): Narviar Browne

Background: The evidence-based behavioral treatment of obesity, referred to as the Diabetes Prevention Program (DPP), has proven its effectiveness when used with long-term weight loss maintenance programs (LWLMP). The DPP consists of two parts: (1) consisting of weekly sessions (2) focuses on lifestyle changes needed to succeed long-term. Once DPP is completed, the LWLMP begins. To analyze the effectiveness of the DPP in conjunction with LWLMP in the treatment of patients with obesity, the researcher performed a single-subject case design (SSCD) as a therapeutic intervention method with an obese female. Methods: A literature review and SSCD were used to analyze the effectiveness of DPP and LWLMP in therapeutic intervention. Furthermore, there was a review of the research based on: methodology, strengths, and limitations to the single-subject case design. Results: It is anticipated that the exhaustive literature review and analysis of DPP with LWLMP will reveal the efficiency of DPP treatment of obesity when used with LWLMP in therapeutically treating obese patients. The use of the SSCD, evidence-based therapeutic techniques, and client self-monitoring and recording of data will validate DPP in conjunction LWLMPs in obese patients. Finally, the use of DPP and LWLMP will provide the subject with long-term success throughout life. Conclusions: DPP used with LWLMPs is an efficient therapeutic technique to use when working with obese patients. LWLMPs change the outlook of DPP from being a short-term success to long-term success for the patient.

Significance of Donor Retention

Presentation - [Join now.](#)

3:00pm – 3:15pm

Undergraduate Student(s): Quinley Whitley

Research Mentor(s): Darlene Xiomara Rodriguez

Many children all across the Metro-Atlanta area have witnessed or personally experienced abandonment, neglect and/or abuse. The Center for Children and Young Adults (CCYA) is just one center whose mission is to provide stability and basic needs for the 42 kids they serve. As CCYA being a 501(c)3, they fully confide in the community and without that support, they would not have the capability to keep their doors open to the population being served. It takes a village to keep a steady inventory of food, clothing and monetary income to be able to keep CCYA running and still be able to provide the best for the kids. The overall purpose of this research is 1) understand the significance of donor

retention and 2) how CCYA can stay connected with recurring donors and lapsed donors by incorporating new strategies that will encourage donors to feel worthy. I will be collecting quantitative and qualitative data from current and lapsed donors between January 2021 and April 2021 to develop a better understanding of recurring and lapsed donors to decide the best plan of action to grow CCYA's donor retention rate. This will help me recognize when donors appear to be more inclined to donate to charitable causes and as a result, determine new strategies to address gaps in donations during the year; how best to increase donations during otherwise slow donation periods; and note or attempt to eliminate periodic lapses in donations. My goal at the end of this research is to be able to give CCYA effective strategies that will help continue their work with lapsed donors and keep the recurring donors coming back.

College Students' Mental Health Help Seeking Behaviors

Presentation - [Join now.](#)

4:40pm – 4:55pm

Graduate Student(s): Rachel Johnson

Research Mentor(s): Monica Nandan, Brian Culp, and Dominic Thomas

In recent years, college students' mental and emotional health has become a more dominant focus among higher education administrators, faculty members as well as researchers. The present study explored mental health help seeking behaviors among college students and identified how they seek assistance related to behavioral health and substance abuse disorders. The sample consisted of 259 college students at one of the 50 largest public institutions of higher education in the southeastern United States. Thematic analysis was utilized to develop 7 key findings: 1) types of support to family and friends experiencing mental health concerns, 2) most likely resources to use, 3) least likely resources to use, 4) needing help and receiving help, 5) barriers to receiving help, 6) perceptions for change, and 7) online help seeking word choices. Findings confirm that help-seeking is a multifaceted process involving both social and professional supports.

Understanding the Impact of Racism in Healthcare and How It Is Affecting African American Women (Part 2)

Presentation - [Join now.](#)

10:20am – 10:35am

Undergraduate Student(s): Magdalene Boadu

Research Mentor(s): Darlene Xiomara Rodriguez

Healthcare is the most sacred part of every person's life and should be accessible. However, the experience for many is that "you either got it or you don't". A way to help "get it" [Healthcare] is through workplace insurance, however, this is not accessible to many. This is especially the case for minority communities who cannot afford insurance plans, if and when offered by their employers, or other alternatives for accessing affordable health care. The terms "affordable and health care" are a paradox, for African American women. This is because of a system that was built to benefit one race but truly affects others. These particular guidelines in place make it very difficult to obtain coverage for basic needs, rendering Black women to make a decision that may affect her life or the family she is

trying to create. The purpose of this session is to report on exploratory research using 10 published articles regarding African American women's experience with the health care system. Research regarding their experience varies from personal stories to data surrounding similar death stories. Based on our initial exploration, there appears to be implicit and explicit bias against African American women, especially in prenatal and post-partum care. The birth-death rate for African women is growing at an alarming rate and people of color want to understand why. To support that statement there is data from the CDC stating that the pregnancy-related mortality ratio of African American women older than 30 was four to five times higher than it was for white women (CDC, 2019). Using data from Cobb and Douglas Public Health in the suburb of Atlanta, Georgia, is confirming the fact that insurance is a huge problem for receiving care. The connection leads to the problems many African Americans go through just to receive basic care with the high mortality death rate of pregnant African American women as an example.

Life after the Trauma: CBT for Female Rape Survivors

Presentation - [Join now.](#)

11:00am – 11:15am

Graduate Student(s): Jessica Trotter

Research Mentor(s): Narviar Barker Browne

Cognitive Behavioral Therapy (CBT) has proven effectiveness in treating a range of psychological disorders. Imaginal Reality Exposure (IRE), an essential component of evidence-based CBT, is often used in treating panic disorders, post-traumatic stress disorder (PTSD), and social anxiety disorders. Deep breathing exercises can normalize cortisol levels and help reduce PTSD symptoms. Rape survivors, especially, experience extreme anxiety, fear, and the potential of dissociative personality disorder. To evaluate the efficacy of Imaginal Reality Exposure (IRE) and Deep Breathing Exercises in the treatment of rape survivors, the researcher used a case study to perform a single-subject design as a therapeutic intervention with a fictional female rape survivor.

Effective Strategies for Organizing and Implementing an Advisory Board Operating Within a Larger System of Advisory Boards

Presentation - [Join now.](#)

2:20pm – 2:35pm

Undergraduate Student(s): Joseph Loch

Research Mentor(s): Darlene Xiomara Rodriguez and Britt Pickering

An advisory board is a collection of people from the community that meet with an organization to provide brainstorming, advice, and counsel that is guided by the needs of the organization. Various organizations utilize advisory boards to maximize their potential. In fact, hundreds of advisory boards across the United States have participated in research studies to narrow their purposes and characteristics. Among this research, a gap has emerged. Research has yet to observe the best strategies for implementing and operating an advisory board within a larger system of advisory boards. This project was designed to create and implement an advisory board for OwlSwap Sustainability Initiative, a nonprofit operating within the larger network of advisory boards under Kennesaw State University. To

complete this task, an official set of bylaws and board member agreement contracts will be made. Once the advisory board is in regular session, data will be collected from each member of the advisory board through surveys and interviews asking about their experiences on the advisory board and how it compares to other boards they have served on. Conclusions will include documentation of new ideas, successes, and failures, as well as comparisons between OwlSwap's effectiveness before and after the formation of their first advisory board.

Utilizing a Smartphone Application to Improve Health & Wellness within Young Adults

Presentation - [Join now.](#)

2:40pm – 2:55pm

Undergraduate Student(s): Lee McClellan-Karp and James Cooke

Research Mentor(s): Darlene Xiomara Rodriguez

Background: The Cobb and Douglas counties' youth population have three paramount health and wellness priorities 1.) Stress management or mental health 2.) Nutrition 3.) Physical activity. Unfortunately, there are barriers to these priorities for the youth population. Cost is the primary obstacle, and for some, cost prohibits them from seeking medical attention, eating healthier foods, or administering self-care. Cobb and Douglas counties offer programs to help this population eliminate barriers, but there is a lack of awareness of where and how to receive these benefits. Purpose: This research intends to assess the youth population's perspective on health and wellness in Cobb and Douglas counties. This assessment provides essential findings to develop a cohesive strategy to remove the constraints and barriers due to the lack of program awareness of the youth population. Method: Cobb and Douglas Public Health (CDPH) conducted focus groups and asked health and wellness questions to a sample group of youth ages 18–28 years old. CDPH shared the qualitative data to help advance this evaluation project. Results: With the youth population, there is a strong distrust of media, insurance companies, government regulations, and pharmaceutical companies. The participants expressed a need for factual and relevant health and wellness information through various media and event channels. In 2019, 96% of people aged 18–29 used smartphones in the United States (Pew Research Center, 2019). The development of an interactive smartphone app would create engagement and awareness of health and wellness services and activities for the youth population and beyond. This awareness could provide a digital platform for continuous innovative growth of programs benefiting the community's varying demographics.

How Can Volunteers Best Be Utilized During Disaster Relief Efforts?

Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Kylie Burns

Research Mentor(s): Darlene Xiomara Rodriguez

Chaos is inevitable when disaster strikes. Entire communities are ravaged by the turmoil created following catastrophic events. To combat this chaos, strangers and community members alike will organically band together to help ease the strain on each other and attempt to create stability. When disaster hits, the skills of those who respond are put to the test, whether they are qualified experts or

random spectators. A more pragmatic approach to organizing and utilizing volunteers must be offered to those in need to effectively support disaster victims. The components of more efficient volunteer utilization are examined in this study. Better-equipped volunteers with adequate support and guidance are more successful in helping than volunteers with no guide or instruction. The overall purpose of this qualitative research is to 1) Analyze prior studies around volunteer management and 2) Identify and consolidate successful concepts to better utilize volunteerism in disaster scenarios. Data will be collected and evaluated from twenty-two scholarly sources (from volunteer efforts globally) considering cultural and age-related differences. Conclusions will include specific issues, trends, and affiliations such as current management practices, conceptual frameworks, retention challenges, and volunteer health. These results will be presented at the Symposium for Student Scholars to better inform the development of a more complete agenda for volunteer utilization for disaster relief.

Embedded Evaluation of the Identified Low Income Population of Cobb and Douglas County Through the Utilization of the Community Health Needs Assessment

Presentation - [Join now.](#)

3:20pm – 3:35pm

Undergraduate Student(s): Ashley Francis, Corey Phelps, and Leonine Greaves

Research Mentor(s): Darlene Xiomara Rodriguez

The low income population of Cobb and Douglas counties face adversities unique to poverty such as; limited dental care, resources, nutrition, life skills, and information accessibility. Our goal is that through utilization of the community assessment provided by the Cobb and Douglas Public Health Department, we may better understand, address, and meet the needs of the low income community. The objective is to develop a set of programs employing embedded evaluation that will both satiate and evolve alongside the desideratum, while also removing any/all barriers to accessibility. Through evaluation of the available data and research collected in the community health needs assessment conducted by the Cobb and Douglas Public Health Department, we identified four main areas of need for the low income community. The first area of need for low income community of Cobb and Douglas county is information accessibility which contains community based services, information sessions, referral networks, and a comprehensive database for local accessibility. The second area of need identified is dental care, both preventative and affordability (sliding scale). Nutrition is the third area of need that we identified which includes access to fresh food and self efficacy which would involve classes such as cooking, nutrition, and access to a community garden. Last, the fourth area of need is life skills and access to classes such as: resume workshops, budgeting, affordable shopping techniques, and dispelling myths and misinformation. In understanding and abiding by the contextual conditions and influences unique to the low income population of the Cobb and Douglas county community, a logic model was created, that through utilization of embedded evaluation, seeks to adapt and evolve to continually fulfill the changing needs of this community.

Substance Misuse Prevention among School-Aged Students

Presentation - [Join now.](#)

9:40am – 9:55am

Graduate Student(s): Adam Meacham

Research Mentor(s): Monica Nandan

Problem: School aged children are particularly at higher risk for mental health and substance misuse related problems, more so since COVID 19 epidemic. Environmental risk factors have been identified by SAMHSA such as poverty, divorce, peer drug use, early aggressive behavior among many others, are cumulative over a person's lifetime with respect to behavioral health. As risk factors accumulate and protective factors correspondingly decrease, children experience higher rates of substance misuse, depression, anxiety, and self-harm. Literature Review: The literature review covers two main topics: effectiveness of prevention programs; schools-community partnerships. Peer education models have had success with enhancing student knowledge about addiction as well as increasing levels of self-efficacy perception. One example of a successful partnership is the FACES program in Ontario. Results from the program showed a positive impact on community engagement for participating stakeholders, as well as a smoother transition for the children. Program Implementation and Evaluation Methodology: 9 KSU students were trained in in SPF (Strategic Prevention Framework) model, Mindfulness and Sources of Strength. Two schools with very diverse student populations were selected to partner with KSU for these three interventions. Students from one school were trained in SPF and Mindfulness; students from the second school were trained in SPF and Sources of Strength. This presentation will provide an overview of the pre-post test results from the SPF training since the post-test from Mindfulness and Sources of Strength will occur in May. Also, the presentation will provide an overview of the partnership and action-based research.

Obstacles Encountered by Rural Communities in Healthcare

Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): Lordy-Monica Brisson and Mackenzie Harris

Research Mentor(s): Darlene Xiomara Rodriguez

The U.S. Census Bureau reported that 15% of the U.S. population lives in rural areas. However, addressing and confronting these challenges have their obstacles. As part of HS3600: Program Development and Evaluation, our research team sought to explore if, how, and when the health of Douglas County residents was impacted because of the rural nature of their community. We specifically examined focus group data from Cobb Douglas Public Health Community Health Assessment (2017–2021). Our thematic analysis of the data indicates, that as a result of the study, it was shown to be a strong correlation between geographical location being a barrier to having limited access to healthy nutrition and healthcare options. Focus group participants had difficulties setting up and attending appointments as the distance from their home to the healthcare facilities was greater than they would have liked. Moreover, As well as the residents resorting to unhealthy eating habits as they were more affordable and within physical proximity. reach. Based on this data, we reviewed academic and grey literature to determine if local experiences matched researched in other local contexts. This appears to be the case. In light of COVID-19, we know that these obstacles have been exacerbated, thus we have some recommendations for our local public health agencies to consider when working with

rural communities. We will share our report of findings and recommendations with Cobb and Douglas Public Health as they embark on the community health assessment (2023–2027).

Understanding Mental Health Diagnosis in Youth and Recognizing Alternative Frameworks and Treatments

Presentation - [Join now.](#)

11:40am – 11:55am

Undergraduate Student(s): Angel Gaither

Research Mentor(s): Hans Skott-Myhre, Darlene Xiomara Rodriguez, and Nicholas Ellwanger

An individual's mental health is an important factor for a fulfilling life as physical health, especially for children, whose future is greatly affected by how mental healthcare is administered to them. The research questions under exploration in the literature review focus on determining whether the current institutionalized methods of defining, diagnosing, and treating mental illness in youth are valid and effective. The research also addresses alternative methods that can be implemented for improving mental health in children, as well as determining the alternative frameworks through which to view and apply to those processes. Current models of diagnosis in the United States are analyzed, with an attempt to determine the issues that exist within the current system. The research focuses on the models used in psychology and psychiatry to diagnose individuals. Special attention is given to the question of whether the use of standardized and pharmaceutical-driven medication as treatment makes sense in the context of modern mental health and how it is currently interwoven with the diagnostic system. With an understanding of the basis of the existing framework, research of alternative frameworks of the diagnostic process will be described. These frameworks aim to establish mindsets of mental disorder treatment that address the limitations of the existing diagnosis processes. Alternative treatment options brought forth in research and methods to incorporate them into existing mental healthcare systems are also explored. These alternative frameworks and treatments are established to facilitate adequate and fair support for every child's mental development, as well as to improve the state of mental healthcare for all individuals in society. The methodology used to analyze the literature is a discourse analysis to understand how the language, which is currently used by institutions and society alike, is problematic when it comes to diagnosing children with mental illnesses.