



November 18, 2021



*Fall 2021
Symposium
of Student
Scholars*

Hybrid Event



KENNESAW STATE
UNIVERSITY

Program

- 10:30am – 4:45pm: Check-in (Gymnasium)
- Hors d'oeuvres and snacks served all day
 - Free giveaways for all attendees
 - Pre-recorded video presentations available online all day
 - Registered Student Organizations (RSOs) table displays all day
- 10:30am – 11:30am: Concurrent Session #1
- Posters in the Gymnasium
 - In-Person Oral Presentations in M 132 (Textile Building) and J 381 (Atrium Building)
 - Virtual Presentations on Microsoft Teams
- 11:45am – 12:45pm: Concurrent Session #2
- Posters in the Gymnasium
 - In-Person Oral Presentations in M 132 (Textile Building) and J 381 (Atrium Building)
 - Virtual Presentations on Microsoft Teams
- 1:00pm – 2:00pm: Concurrent Session #3
- Posters in the Gymnasium
 - In-Person Oral Presentations in M 132 (Textile Building) and J 381 (Atrium Building)
 - Virtual Presentations on Microsoft Teams
- 2:15pm – 3:15pm: Concurrent Session #4
- Scrappy available for photos!
 - Posters in the Gymnasium
 - In-Person Oral Presentations in M 132 (Textile Building) and J 381 (Atrium Building)
 - Virtual Presentations on Microsoft Teams
- 3:30pm – 4:15pm: Career Preparation Workshops
- **Upgrade your Resume: Highlighting Your Research Experience in Resumes** by Tarrance Mosley (Assistant Director, Career Advising and Planning) and Diehl Martin (Career and Internship Advisor) in the Atrium Building, Room J 381 or [virtually in Microsoft Teams](#)
 - **Acing Your Interview: Highlighting Your Research Experience in Interviews** by Allie Johnson (Career and Internship Advisor) in the W. Clair Harris Textile Center, Room M 132 or [virtually in Microsoft Teams](#)
- 4:15pm – 5:00pm: Reception
- 5:00pm – 5:15pm: Awards Ceremony
- Dr. Kathy Schwaig, Interim President
 - Dr. Ivan Pulinkala, Interim Provost and Vice President of Academic Affairs
 - Dr. Phaedra Coros, Vice President for Research
 - Dr. Amy Buddie, Director of the Office of Undergraduate Research

College of Computing and Software Engineering

Data Science & Analytics

Incidence, Prevalence and Deaths of COVID-19 in Mexico from January 2020 to August 2021

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Ryan Lowhorn

Research Mentor(s): Mohammed Chowdhury

The purpose of this study is to characterize the clinical features and risk factors for COVID-19 mortality in Mexico. The information utilized in this study was made available by the SISVER of MoH (Ministry of Health) and includes COVID-19 patients diagnosed between January 29, 2020 and August 16, 2021. Chi-square tests, Kaplan-Meier curves, and multivariate logistic regression models using a generalized estimation equation were used to evaluate the COVID-19 mortality risk. We find that the risk of dying from COVID-19 is strongly linked with sex, age, and the three most frequently observed comorbidities (hypertension, diabetes, and obesity) ($P < 0.0001$, $OR > 1.0$). End-stage renal disease, chronic obstructive pulmonary disease, immunosuppression, and asthma are all found to be associated with COVID-19 patient deaths ($P < 0.0001$). Smoking use is also found to be a significant risk factor for mortality ($P < 0.0001$) in patients positive for COVID-19. ICU admission, patient intubation, and pneumonia diagnosis are all found to be associated with a significantly higher risk of mortality ($P < 0.0001$) in COVID-19 patients. Male patients over the age of 41 years who smoked were more susceptible to hospitalization and mortality as a result of COVID-19.

Computer Science

Joint Latency-Energy Optimization Scheme for Offloading in Mobile Edge Computing Environment Based in Deep Reinforcement Learning

Virtual oral presentation – [Join now](#)

12:15pm – 12:30pm

Graduate Student(s): Jui Mhatre

Research Mentor(s): Ahyoung Lee

With the increasing number of mobile devices (MD), IoT devices, and computation-intensive tasks deployed on these devices, there is a need to increase the efficiency and speed of the deliverable. Due to inadequate resources, it is infeasible to compute all the tasks locally. Similarly, due to time constraints, it is not possible to compute the entire task at a remote site. Edge computing (EC) and cloud computing (CC) play the role of providing the resources to these devices on the fly. But a major drawback is increased delay and energy consumption due to transmission and offloading of computation tasks to these remote systems. There is a need to divide the task for computation at local sites, edge servers, and cloud servers to complete tasks with minimum delay and energy consumption. This paper proposes

offloading strategy computation using Multi-Period Deep Deterministic Policy Gradient (MP-DDPG) algorithm based on Reinforcement Learning (RL) to optimize the latency caused and energy consumed. We formulate our problem as a Multi-period Markov Decision Process (MP-MDP). In this paper, we use the two-tier offloading architecture including more than one mobile device (MD), two EC-servers, and one CC-server as computation sites. Further, we also compare our proposed algorithm using one-tier architecture and one edge server with the Deep Deterministic Policy Gradient (DDPG) algorithm with similar architecture.

Information Technology

Non-Invasive Monitoring of Human Hygiene using Vibration Sensor and Classifiers

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Shashank Trivedi

Research Mentor(s): Maria Valero, Hossain Shahriar, and Liang Zhao

Aging can be quite an intimidating process for some, especially for those who live alone at home or in an assisted living facility. Although it is a natural progression of life, the stigma around aging as it relates to health is an area of concern for our growing population. Conditions such as dementia and anxiety can often impact older generation which can lead to further deterioration of health. Luckily, we live in an era of digital advancements in both the technology and health sectors that can provide opportunities for research and development such as this – our work focuses on leveraging the strength of vibration sensors and classifiers to detect an activity and categorize based on machine learning. We are using a combination of geophone (seismic sensor), digitizer board, and a single-board computer in an enclosure. All the data collected would be stored locally on the device using influx database and accessed via Grafana. The single board computer is responsible for reading and processing the signals to detect the water vibration and duration of the hygiene events. Once the event has been recorded, we will use machine learning to categorize the hygiene events as activities through feature extraction. The goal behind this research is to automate the process of “detection of a hygiene event” which can assist our healthcare workers to be proactive in detecting a potential health crisis.

Non-Invasive Glucose Monitoring System using RaspberryPi four

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Priyanka Pola

Research Mentor(s): Maria Valero

Diabetes is a metabolic disease that causes high blood sugar. It is the most predominating condition in population between 45 and 64. In this population, periodic glucose monitoring is crucial to keep blood glucose levels under control and take appropriate medication. The traditional method for monitoring

blood glucose involves the use of a glucometer that requires a blood sample obtained from the person's finger after being pricked. One cannot deny the fact that this method causes discomfort and stress at the sight of puncture. In this research, We propose a Non-Invasive Glucose Monitoring System, which is easy to use, inexpensive and most importantly, does not require any blood samples. Patients will have a simple and effective way to keep Diabetes in control without discomfort. The use of optical sensors has gained much attention in recent years. Taking those sensors and leveraging the capabilities of small cameras, we create a prototype that is connected to a Raspberry Pi. The prototype captures images of the fingertip when a laser beam is directed to human tissue. Blood glucose concentration can be estimated by studying the absorption, reflection properties, and analyzing how the light is transmitted along the finger. An artificial neural network model is proposed to be built and trained by the image dataset obtained to predict blood glucose level. The design includes a smartphone app which will be able to send an alert a physician if needed. This idea will help the diabetes community and make a blueprint for future research.

IoT Clusters Platform for Data Collection, Analysis and Visualization

In person oral presentation – Room M 132

11:45am – 12:00pm

Graduate Student(s): Soin Abdoul Kassif Traore

Research Mentor(s): Maria Valero

The Internet of Things (IoT) popularity leads more scientists and students to research this field. IoTs have an efficient way of monitoring complex infrastructure systems and the environment around them. Thus, they intervene in several areas such as health care, engineering, or monitoring the effects of climate change. IoT's primary function is to collect data and share them with a distant server through the internet or a private network. Research on IoTs is firstly about creating efficient light devices composed of sensors that follow rigorous security protocols to guarantee the integrity of the data from the collection to its final destination. Secondly, the challenge is to store the data on a secure platform accessible by competent people for its analysis and visualization. The next generations of IoT devices will have to pass through multiple tests to satisfy collection, transmission, and storing challenges. Our research implementation provides a physical system allowing users to set and configure sensors on Raspberry Pis or Arduino for data collection, a secure data transfer using APIs, and a cloud base storing space for visualization and analysis. The objective is to make research on IoT devices easier by providing a ready-to-use platform that allows research teams to focus on developing and testing new devices. Also, it offers real-time visualization of collected data via a web bases application and an adequate database for future analysis. Our platform aims to help students conduct IoT research projects or provide a complete database to those interested in data science on various sensors or IoT devices.

A Federated Learning Framework for Detecting False Data Injection Attacks in Solar Farms

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Jiaming Li
Research Mentor(s): Liang Zhao

Smart grids face more cyber threats than before with the integration of photovoltaic (PV) systems. Data-driven based machine learning (ML) methods have been verified to be effective in detecting attacks in power electronics devices. However, standard ML solution requires centralized data collection then processing that is becoming infeasible in more and more applications due to efficiency issues and increasing data privacy concerns. In this letter, we propose a novel decentralized ML framework for detecting false data injection (FDI) attacks on solar PV DC/DC and DC/AC converters. The proposed paradigm incorporates the emerging technology named federated learning (FL) that enables collaboratively training across devices without sharing raw data. To the best of our knowledge, this work is the first application of FL for power electronics in the literature. Extensive experimental results demonstrate that our approach can provide efficient FDI attack detection for PV systems and aligned with the trend of critical data privacy regulations.

Emotional Analysis of Learning Cybersecurity with Games

In person oral presentation – Room M 132

12:00pm – 12:15pm

Graduate Student(s): Shahriar Sobhan and Michael Handlin
Research Mentor(s): Maria Valero, Lei Li, and Hossain Shahriar

The constant growth of cyber-attacks poses an increase for more qualified people with cybersecurity knowledge. The cybersecurity professionals are high demanding to have adequate motivation and reasonable skills to detect, prevent, respond and mitigate the effects of such threats. Cyber Security Games have emerged as a well-fitted technology to engage users in learning processes. In this work, we analyze the emotional parameters of people while learning cybersecurity through computer games. The data are gathered using a non-invasive Brain-Computer Interface (BCI), a neurotechnological discoveries based on Electroencephalography (EEG) which enabled to study the signals directly from the users' brains. We analyze six performance metrics (engagement, focus, excitement, stress, relaxation, and interest) of 12 users while playing computer games to measure the effectiveness of the games to attract the attention of the participants having previous knowledge. The collected data from the brain signal through the Emotiv EPOC+ neuroheadset were extracted and imported into a powerful stream data database InfluxDB and employed Grafana tool for visualizing the data to show the performance parameters with a timestamp for easy analysis. Two games "Buffer Overflow" and "Access Control" were used for the analysis. The analysis of these factors were mainly conducted from the game point of view and not from the real feelings of the participant. The results show participants were more engaged with parts of the games that teach "Access Control" than others that teach "Buffer Overflow" mainly due to the interactivity of the game. We also discuss the future of BCI in the creation of effective games to teach cybersecurity topics.

Software Engineering and Game Development

EHR Data Management: Hyperledger Fabric-Based Health Data Storing and Sharing

In person poster – Gymnasium

1:00pm – 2:00pm

Graduate Student(s): Md Jobair Hossain Faruk

Research Mentor(s): Hossain Shahriar and Maria Valero

Despite the type of industry, data sharing has always been a concern across the globe within the conventional database model; particularly in the healthcare industry, where the lack of data interoperability in existing applications creates not only security and transparency issues in EHR but also cost-related concerns that impact the quality of patient care. Without adopting novel and emerging technologies that allow patients to store and share EHR data within a tamper-evident, immutable, and secure data storing and sharing network, this current problem could not be resolved. Emerging Hyperledger Fabric-based Blockchain technology can be an ideal solution to address these issues. In this research, we propose an advanced EHR data management architecture. We adopt a consortium blockchain technology to design and implement a central data storing and sharing network using Hyperledger Fabric focused on EHRs data. Individual patients, healthcare providers, and institutions will be identified by utilizing smart credential management (SCM) and proxy re-encryption scheme that will protect not only patients' privacy but also incorruptible, secure EHR data storing and sharing. We construct an application prototype to implement our conceptual architecture using Hyperledger Fabric and evaluated its performance to demonstrate its effectiveness in EHR-based data storing and sharing in a secure, immutable, and transparent network. The primary demonstration result indicates that the proposed architecture can be used by the different entities including (i) patients to access and share the EHR data with doctors and/or third parties; (ii) healthcare providers to store and access patient's records with proper content; and (iii) authorized third parties to access shared EHR data that could be read-only or read-write both access seamlessly. For auditing purposes, each attempt in storing, sharing, and accessing EHR data by the authenticated users within the proposed network is stored in the ledger, which is transparent and immutable. Our future goals include implementing the proposed architecture on large-scale development and investigating the feasibility to exploit the potential of the technology.

From Ideas to Expressed Needs: An Empirical Study on the Evolution of Requirements during Elicitation

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Sourav Debnath

Research Mentor(s): Paola Spoletini and Alessia Ferrari (Collaborator from CNR-ISTI)

Requirements are elicited from the customer and other stakeholders through an iterative process of interviews, prototyping, and other interactive sessions. Many communication phenomena may emerge

in these early iterations, that lead initial ideas to be transformed, renegotiated, or reframed. Understanding how this process takes place can help in solving possible communication issues as well as their consequences. In this work, we perform an exploratory study of descriptive nature to understand in which way requirements get transformed from initial ideas into documented needs. To this end, we select 30 subjects that act as requirements analysts, and we perform a set of elicitation sessions with a fictional customer. The customer is required to study a sample requirements document for a system beforehand and to answer the questions of the analysts about the system. After the elicitation sessions, the analysts produce user stories for the system. These are compared with the original ones by two researchers to assess to which extent and in which way the initial requirements evolved throughout the interactive sessions. Our results show that between 30% and 38% of the produced user stories include content that can be fully traced to the initial ones, while the rest of the content is dedicated to new requirements. We also show what types of requirements are introduced through the elicitation process, and how they vary depending on the analyst. Our work contributes to theory in requirements engineering, with empirically grounded, quantitative data, concerning the impact of elicitation activities with respect to initial

College of Humanities and Social Sciences

Communication

Marriage Story Screenplay Analysis

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Kaitlyn Bauer

Research Mentor(s): Anna Weinstein

This presentation examines the story structure of the Oscar-nominated film, Marriage Story (2019), written and directed by Noah Baumbach. The film captures the dissolution of a marriage, following a couple as they navigate life with their son as their marriage unravels. In this analysis, I study how Baumbach crafts the screenplay to explore both subjective viewpoints in the story so the audience does not pick sides in the divorce. This differs from most single-protagonist divorce stories, where the writer tackles the narrative from one character's point of view, favoring one parent over the other. Marriage Story is a dual-protagonist film, following Charlie (Adam Driver) and Nicole (Scarlett Johansson), and this analysis examines the methods Baumbach uses to feature each character's perspective equally throughout. Although the characters exchange harsh words, their role as a good parent is never questioned. Baumbach consistently reminds viewers of the good that was once present in their marriage, allowing the audience to root for both of them despite the inevitable outcome.

Gifted Screenplay Analysis

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Chloe Ford

Research Mentor(s): Anna Weinstein

Gifted, the film directed by Marc Webb released in 2017, details the story of a single man named Frank (Chris Evans) raising his young niece Mary (McKenna Grace), who just so happens to be a 7-year-old genius. He plans for her to live a normal life; go to public school, make friends, play sports, truly be a kid, but his mother has something else in mind. McKenna's grandmother Evelyn (Lindsay Duncan) threatens to rip Mary away from her little life in the suburbs, as well as her beloved Uncle Frank. This study analyzes the complexity of the characters in this film. With this analysis, I map the arcs of each character, revealing the choices the screenwriter made to bring to life the characters' individual and unique patterns of growth over the course of the film. I analyze the relationship between character development and story structure, with a heavy focus on the character maps of Frank and Mary.

English

An Analysis of Dan Fogelman's Screenplay Life Itself (2018)

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Neenah Reid

Research Mentor(s): Anna Weinstein

In this study, I analyze the structure of the film Life Itself (2018), written and directed by Dan Fogelman. Specifically, this research aims to unravel the ensemble structure of this film, mapping the major characters and the significant turning points in their individual storylines to better understand how Fogelman builds a single film story around multiple equally weighted characters. This study will discuss the difference between ensemble films and films with a single protagonist and provide insight into characters such as Will and Abby and how they influenced the lives of the other characters in the film. In the research, I will also discuss the story structure and argue the tactics Fogelman used to make this a great film, despite being negatively reviewed by critics.

Screenplay Analysis: An Evaluation of Strategy of Mean Girls

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Zora Evans

Research Mentor(s): Anna Weinstein

This presentation explores the hardships and drama-filled journey of adjusting to high school. Protagonist Cady Heron has just moved all the way from Africa to the United States in the 2004 comedy film Mean Girls. Heron's main objective in the film is to adjust to public school, find a group of

friends, and fit in. Tina Fey writes this script in a very precise and unique way. This study addresses how Tina Fey's script creates side characters that are more memorable and active than the protagonist while keeping the interest of the audience. Fey's writing styles and strategies actively help to push the film forward through everyone except Cady Heron. The popular girls, also known as "The Plastics," and Cady's friends Janis and Damian push the storyline along for the main character, which makes the storyline unique and grasps the audience's attention. Fey uses many of the supporting characters to build the protagonist's conflict, journey, and resolution, which is an incredibly unique strategy. Most successful movies have a very active protagonist making choices that push the story forward, but Tina Fey's Mean Girls breaks the mold and introduces a new way of screenwriting.

Analyzing the Symbolism of Modern Racial Tension in Jordan Peele's Get Out

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Kyra Hammond

Research Mentor(s): Anna Weinstein

In award-winning films, themes surrounding race and ethnicity are typically avoided unless regarded in a historical context. Though, Jordan Peele's Get Out (2017) breaks these barriers by taking a satirical approach to comment on modern racial issues and stigmas that are prevalent in American society. Furthermore, the film pushes society to finally see and understand the anxiety and racial trauma that African Americans continue to experience. The hidden symbols and messages throughout the screenplay further add to the film's theme by metaphorically expressing that racism can be covert. With the intention to analyze these symbolic elements, I will break down the overall structure of the screenplay to reveal how certain aspects support the overarching theme of racial tension. In addition, characterization will be noted as the main characters represent similar and opposing beliefs influenced by racism. With this research, I will argue that Peele effectively uses symbolism throughout the screenplay to reinforce the theme of racial tension in the current climate of today.

Art of Adaptation: The Comparison Between the Book and the Film

Virtual oral presentation – [Join now](#)

1:45pm – 2:00pm

Graduate Student(s): Jaime Blei

Research Mentor(s): Anna Weinstein

This study examines the differences between the children's book, SHREK! (1990), written by William Steig, and the Oscar-winning screenplay Shrek (2001), produced by DreamWorks. This analysis focuses on key strategies the screenwriters used to transform a 35-page illustrated children's book into a full-length screenplay, which includes developing the plot, adding settings, modifying the protagonist to make him more sympathetic, adding supporting characters and developing their relationships,

modifying dialogue, and creating a structure that expands beyond the original story to meet the demands of screen storytelling in Hollywood.

The Old Guard: A Screenplay Analysis

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Macy Dykes

Research Mentor(s): Anna Weinstein

*This project analyzes the screenplay of the 2020 film *The Old Guard*, written by Greg Rucka. *The Old Guard* presents an interesting look into screenplay development as it is based on a comic series by the same name. Though comic book movies have recently dominated popular culture, *The Old Guard*'s adaptation stands out from others in the genre as the film was written by the same person who wrote the original source material. Rucka adapted his comic story into a classic 3-Act narrative structure that follows a diverse group of protagonists. This analysis examines how the screenplay for *The Old Guard* structures the story for the screen and utilizes basic film principles to convey a narrative centering around multiple main characters.*

Guest Who - An Analysis of For Your Consideration by Christopher Guest

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Will Amato

Research Mentor(s): Anna Weinstein

*Christopher Guest mockumentaries shaped a generation of comedy in America. Films such as *Waiting for Guffman* (1996,) *Best in Show* (2000,) *A Mighty Wind* (2003,) and most recently *Mascots* (2016,) on Netflix rank historically among the funniest movies ever made and have all received critical acclaim, with one exception. The mockumentary, *For Your Consideration* (2000), while in the same vein as the others, did not perform as well in the box office and is not the beloved favorite like Guest's other films. Critics and fans alike were disappointed, and it remains his least popular work. Many Christopher Guest fans have never even heard of the film. *For your Consideration* deals with a cast of Hollywood hacks creating a dramatic independent film. Word gets out that aging star, Marilyn Hack, may be nominated for an Oscar for her performance before the film has finished shooting. Despite an all-star cast of hilarious improvisors, the film doesn't work. A number of scholars have theorized about why the movie was not a success, often claiming that Christopher Guest films are better when parodying quaint small-time topics like community theatre show or the Purina dog show and that he was punching too high with the Oscar awards. I contend that the issues with *For your Consideration* have everything to do with a lack of structure, absence of an empathetic protagonist with a clear goal, and other fundamental cinematic storytelling devices that are present in Guest's other films.*

The Impact of Endings

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Carolina Solis

Research Mentor(s): Anna Weinstein

*This presentation explores the importance of movie endings, and how an ending can impact the audiences' opinion of a movie. I look at Ronald Bass' *Sleeping with the Enemy*, and how he developed Julia Roberts' character in a way that made the audience believe that not only was she capable of killing her abusive husband, but that she should kill him. I also look at Frank Darabont's *The Shawshank Redemption* and discuss how Andy's eventual escape from prison was too much of a surprise to the audience, and how the movie should have ended with Norton's suicide. Finally, I look at Callie Khouri's *Thelma & Louise*, and how the duo driving their car off of a ledge was not only surprising, but inevitable. Endings are what the audience remembers the most, and they are capable of making or breaking a movie.*

Screenplay Analysis of The Princess Bride

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Noah Smith

Research Mentor(s): Anna Weinstein

*In this study, I examined the choices Oscar-winning screenwriter William Goldman made in developing the structure for his film *The Princess Bride* (1987). I draw on insights from Goldman's book, *William Goldman: Four Screenplays with Essays* (1995), as well as Blake Snyder's *Save the Cat!* (2005). This analysis uses Blake Snyder concepts of story beats like opening image, catalyst, all is lost, etc. I as well use his concepts of genres like golden fleece, out of bottle, etc. In this analysis I decipher and depict which of his genre, or genres, this film fits into. This analysis also not only looks at the characters by themselves, but also as a whole of how they interact with each other. This film is a complicated one in that it's written as a multi-protagonist and multi-antagonist film. This can get complicated but in the analysis I observe how the writing was done to make this complicated idea work.*

Implementing a Deliberate Neologism about the Filipino-American Identity Crisis

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Gabrielle Punzalan and Angela Brill

Research Mentor(s): Rochelle Harris Cox

Neologisms are words that have recently entered our language but are only just beginning to be accepted as part of daily usage. As the English language evolves, new neologisms are formed while the usage of certain words may fade into relative obscurity. New words are coined to reflect the changing

moods and cultural needs of the time. When it comes to critical race theory, neologisms can be used as a method of spreading awareness and addressing a problem. The Filipino American community is a marginalized group that experiences identity disturbance from the duality of both their nationality and ethnicity. Furthermore, there seems to be prejudice for Filipinos in the diaspora from both Filipinos from the Philippines and Americans alike. The Filipino American identity has been the subject of debate between Filipinos and Americans. Our neologism, "incogthymia," was invented in response to this debate. In this presentation, we will showcase the process of inventing & the results of attempting to implement a deliberate, academic neologism. We also highlight evidence from scholarly articles and personal accounts to demonstrate the Filipino American Identity Crisis.

David Lynch: A Hollywood Misfit

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Niels Goessel

Research Mentor(s): Anna Weinstein

*American filmmaker David Lynch is known for his surrealist, dreamlike work and association-based approach that leaves many people puzzled if not dismissive. Yet at the same time, he is an incredibly successful Hollywood director. What makes his complex and convoluted work approachable to a mainstream audience? In this project, I try to find structure and analyze the purpose of certain scenes and plot points in his 1997 feature-film *Lost Highway*, as well as different themes and multiple possible interpretations. It is Lynch's spin on the "jealous husband and cheating wife" trope, observed through a psychosexual lens. Despite Lynch himself not being in favor of explaining his films to his audience ("The film is the talking!"), I search for conscious or subconscious structure to explain the effect of the film on the audience.*

I Am Legend Breakdown

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Andrew Petersen

Research Mentor(s): Anna Weinstein

I am Legend. (2007) Why is this title even significant? It is about a man who has no future trying to leave behind something great for the sake of everyone else's future. He is the living legend. The setup is very clear. I am going to explain the plot and why it is so perfectly structured. I will dive into the main theme of perseverance and explain how the main character is built on this. This story also features a unique co-star dynamic (being that the co-star is a dog) which I will go into depth on as well. All of this boils down to a perfectly structured linear story line (with periodic cuts to a linear backstory) in this film.

Chayefsky's Network

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): William Bradshaw

Research Mentor(s): Anna Weinstein

This presentation will examine the 1976 film Network and specifically how screenwriter Paddy Chayefsky was prescient in two ways. First, that media would be owned by corporate conglomerates and would then be used to promote the corporate image, and secondly that news programming in particular would be used to exploit the anger and fears of identifiable constituencies to increase viewership. This presentation will explore how Chayefsky, a World War II veteran and playwright, became disillusioned with television as an industry and felt it had disregarded its social responsibilities to the public it served. This was in spite, or maybe because, of his personal success as a pioneering writer in television's earliest years. Chayefsky surmised that Americans were angry and therefore wanted angry shows, and this idea was the seed for what eventually became Network. This analysis will identify the causes, the generational politics at play as well as artistic license being balanced against business needs, which led UBS to change its lineup in a radical new direction. Further, the presentation draws comparisons between the script's depiction of UBS's complex corporate ownership and the actual state of media ownership arrangements today. The dilemmas the fictional network executives faced in the script are similar to what media executives face today. They still have to produce a quality product, attract a loyal audience, attract advertisers and turn a profit. They still have to navigate through a generational divide among their management and staff while balancing the artistic and business needs of their organizations.

The Portrayal of Latina Women in Hollywood

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Evelyn Sofia Aguilar

Research Mentor(s): Anna Weinstein

This analysis explores the history and characterization of the "Spicy Latina" trope through the character analysis of Isabel Fuentes Whitman portrayed by Salma Hayek in the film Fools Rush In (1997). The trope has evolved throughout its existence but has remained within the boundaries of "exotic, passionate and dangerous". In Fools Rush In, Isabel Fuentes is depicted as the free-spirited Latina who disrupts the world of the protagonist, Alex Whitman, played by Matthew Perry. Ultimately Isabel is merely a projection of Alex's desires, not reaching full potential as a developed character. The study focuses on how this Hollywood trope can lead to a lack of character development and depth in the structure of a story as it does in Fool Rush In. These repeated portrayals of Latina women have affected not only the actresses who have played and are offered the same roles over and over but also the community.

Analysis of Christopher Nolan's Interstellar

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): John Hunter Ray

Research Mentor(s): Anna Weinstein

In this study, I examine the ways in which Christopher Nolan developed the protagonist in Interstellar (2014). The protagonist, Cooper, played by Matthew McConaughey, is the audience's window into the world Nolan creates in the film. Though typical Christopher Nolan screenplay structure is more complicated than the average feature film, I argue that it is the character development of the protagonist that engages viewers and ultimately allows us to connect with the story. The central conflict that Cooper desires to be the best dad he can be he is forced to abandon his family to save the world. That is crucial to the character to create such a complicated conflict for the protagonist which is an accurate depiction of a father with an impossible decision. Nolan's typical approach is to challenge you to think outside of the box, but in this specific case, it has a grounded method to demonstrate the complexities of space and time.

Analyzing the Screenplay Structure of The Favourite

In person oral presentation – Room J 381

2:15pm – 2:30pm

Undergraduate Student(s): Ori McKinney

Research Mentor(s): Anna Weinstein

The Favourite (2018), written by Deborah Davis & Tony McNamara and directed by Yorgos Lanthimos, transcends the traditional tropes associated with genre period pictures in its unique telling of the tale of two cousins vying to be in Queen Anne's favour during her monarchy. In this presentation I study the unique story structure of this film, which centers on three equally weighted characters. In contrast to the traditional single protagonist story structure, this film shifts the point of view making each lead character either the protagonist or antagonist depending on whose perspective you watch it from. The story is written somewhat like a multi protagonist novel that allows us to understand each character's views on love, power, loyalty, and how these differing views contrast with the other lead characters and pushes the story forward.

Godzilla (1954) Research Analysis

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Cyrus Aldridge

Research Mentor(s): Anna Weinstein

According to Michael Maher, two years after World War 2 the United States' military presence attempted to control Japanese media including its cinema. Despite this fact, Japanese filmmaker

Tomoyuki Tanaka was able to produce Godzilla (1954), symbolizing the horror of nuclear holocaust. In this presentation, I argue that Godzilla is one of the greatest monster movies of all time due to its cultural relevance and its use of musical scoring, set design and costume design. In this study I demonstrate how Tanaka implements its score, set design and costume design to create a compelling film that helps audience understand the terror of nuclear weapons.

Whodunnit: A Screenplay Analysis of Knives Out (2019)

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Natalie Wilson

Research Mentor(s): Anna Weinstein

The murder mystery is a centuries-old story format, and its evolution in film within the recent decades has been an interesting phenom to witness. The best ‘Whodunnits’ always begin with its key element: the screenplay. The 2019 film Knives Out has a screenplay written by the film’s director, Rian Johnson. This was a completely original story with an age-old genre formula, and it wowed audiences through word-of-mouth buzz to make over 300 million in the box office, without the help of any pre-existing IP. In this research presentation, I examine how Zack Snyder’s story beats from his screenwriting book Save The Cat fit the structure of Knives Out (2019) and its script. Through the use of this story structure guide, I highlight how Rian Johnson used both the genre itself and tried and true screenwriting techniques to make a known story fresh to present-day film audiences. Rian Johnson created a colorful cast of characters and an empathetic protagonist to play out his narrative, and through the use of rearranging and restructuring these story beats, he preserved the heart of what makes a good ‘Whodunnit’ while wow-ing viewers who already know what to expect.

Pirates of the Caribbean: An Analysis of The Curse of the Black Pearl and the Adventure Genre On-Screen

[Recorded video upload – oral presentation](#)

Time Not Applicable

Graduate Student(s): Mezi Mulugeta

Research Mentor(s): Anna Weinstein

In Story: Style, Structure, Substance, and the Principles of Screenwriting, Robert McKee maintains that while action-adventure is “often dismissed as mindless fare, it is in fact the single most difficult genre in which to write today...simply because it’s been done to death.” Said death came swiftly for Cutthroat Island, the 1995 flop that sank the pirate subgenre —until Pirates of the Caribbean: The Curse of the Black Pearl premiered in 2003. The film was a risk that paid off massively for Disney, the pirate subgenre, and arguably the adventure genre as a whole in the modern age. This article seeks to analyze how the screenplay, written by Ted Elliott and Terry Rossio, plays within adventure conventions to create a mindful, unique adventure story and breathe new life into the adventure genre on-screen.

Coach Carter Analysis

Not presenting.

Time Not Applicable

Undergraduate Student(s): Tiffany Williams

Research Mentor(s): Anna Weinstein

This study analyzes the strategies used by screenwriters Mark Schwahn and John Gatins in developing the lead character in Coach Carter (2005) played by Samuel L. Jackson. Coach Carter is a film based on a true story used to encourage any young person who may or may not have lost faith in themselves due to unfortunate circumstances around them. In this presentation, I aim to reveal the ways in which the screenwriters used traditional methods to build characters who turned their lives around for the better. I have shown the ways in which a screenwriter can motivate its viewers with someone else's story. I have shown how authentic Mark Schwahn and John Gatins made the screenplay. My analysis shows that an authentic script leads to authentic emotions from the audience. I incorporated important pieces that gives my audience the inspiration the movie intends to give. My analysis is a voiceover that shows my viewers video and photo clips of Coach Carter. The video clips are being shown to show the characters resilience and the hardships they face on and off the court. I intend to efficiently show the screenwriters intentions by following Blake Snyder's beat sheet.

Film Analysis-Hairspray

Not presenting.

Time Not Applicable

Undergraduate Student(s): Taylor Satcher

Research Mentor(s): Anna Weinstein

This film does an excellent job of being light-hearted and realistic at the same time. The screenwriter, Leslie Dixon, did a great job expressing the reality of racial, gender, and physical discrimination while making it an enjoyable watch. Hairspray, the 2007 film, is a remake of the 1988 film of the same name. It is a musical taking place in Baltimore during the 1960's and follows a friendly teen, Tracy Turnblad. Her mind is always focused on other things besides school. She always gets in trouble in school when she eventually gets sent to detention. There, she finds African American people having a grand time listening to music and dancing. At first, they are hesitant because it is not normal for someone like Tracy to be so accepting, but they warm up to her and teach her a few moves. People constantly overlook Tracy's talent because of her physical appearance. However, this does not stop her from following her dreams of earning a spot on "The Corny Collins Show," a popular craze filled with singing and dancing of peers her age. She instantly becomes an overnight sensation, igniting jealousy in those who are victims of getting the spotlight stolen from them. In this study, I examine Leslie Dixon's ability in adapting the 1988 film Hairspray for contemporary viewers in 2007. I also want to analyze how she highlights racial, gender, and physical discrimination, portraying realistic depictions of characters struggling with this conflict, while still maintaining the lighthearted tone.

The Hero's Journey Beyond the Physical

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Jasmine Jones

Research Mentor(s): Anna Weinstein

How would one go about integrating a theme of acceptance of self and others into an adventure, comedy, fantasy, and family friendly film? In the film Jumanji: Welcome to the Jungle, the invisible hand of the screenwriters does just that. The importance of this story is in the story structure. The four main characters are used to exemplify how there is an important relationship between plot and structure. Through this, character transformation takes place both physically and emotionally. The characters are presented as four normal people who were sucked into a game and sent on a quest to solve mysteries and survive but in actuality their quest and means to survive is a direct reflection of how life can suddenly put you in uncomfortable situations that ultimately in the end result in self growth. There is a symbiotic relationship that forms between the 'reader and writer' as readers look for the writer's invisible hand to save the characters. Due to this, the film then has the power to pull on its audiences' emotional core and leave them lingering on the message of how the quest was necessary for their growth

Keywords

character growth, story, structure, emotional journey, physical journey, narrative stage, plot, acceptance

Confidence Is Key: A Moral Study of Kung Fu Panda

In person oral presentation – Room J 381

2:30pm – 2:45pm

Graduate Student(s): Sarah Williams

Research Mentor(s): Anna Weinstein

A moral to the story is commonly associated with fables. It is difficult to state a moral without talking down to your audience. In terms of film, it takes a master screenplay to be able to display a moral properly and incorporate that overall theme into the script. This is what Jonathan Abel and Glenn Berger do so well in their 2008 animated comedy, Kung Fu Panda. The film moves like a fable as it moves around the Valley of Peace's animal population. In this video essay, I explore the theme of self-confidence in various ways that range from screenplay, character development, and character design. By having their audience follow a character who struggles with self-confidence face off against a character who has a large ego, this becomes one of the most important films when dealing with displaying their theme. It presents a story that is easily accessible with a theme that is relatable to everyone.

Oh, the Whomanity: An Analysis of the Theme of Humanity in Doctor Who

In person oral presentation – Room J 381

2:45pm – 3:00pm

Graduate Student(s): Sarah Williams

Research Mentor(s): Anna Weinstein

The theme of humanity is something that is common in science fiction media. Stories set in this genre are often the most human of all. There is no better example of this than in the 2005 revival of the classic BBC series Doctor Who, specifically the two-parter "Human Nature" and "The Family of Blood". It studies how much its titular character, The Doctor, is influenced by humanity when he and his companion, Martha Jones, have to go into hiding. In this video essay, I examine how the structure and the script help to illustrate how much humanity as a whole needs The Doctor. I also examine how the theme is continued in the rest of the show up to its current run and what changes were made from the script when it was transferred to the screen.

Comics vs. Live Action

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Spencer Donohue

Research Mentor(s): Anna Weinstein

This analysis of Avengers: Endgame examines the adaptation of the comics into screenplay. It was directed by Anthony and Joe Russo while it was produced by Kevin Feige. Combining translation from the comics and adaptation into the film, many comic fans regard this adaptation as a saga about failure, with many heroes deal with the destruction of Thanos and ultimately fight to undo his actions. With the conclusion of endgame, Avengers: Endgame will finish the series' longest-running battle that spanned over 20 years of films from Marvel Cinematic Universe. In this film in particular, the screenwriters took their own adaptations of the comics and turned them into a modern spin of what the comics actually portrayed. In the film, there are many differences that took place and ultimately created inaccuracies within the Marvel Universe. This is a common practice in many films but within Avengers: Endgame, it created many plot holes that left many questions. Some of these questions involve characters motives, timelines, cosmic entities, time travel, characters, and universal powers. These are important topics within the Marvel Universe because the film adaptations of the comics ultimately sets the tone of the storyline.

Geography and Anthropology

House Prices vs Population and Public Schools in the Metro-Atlanta Area

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Yzobelle Libosada

Research Mentor(s): Uli Ingram

When it comes to housing prices, there are many factors to consider with an endless list of priorities that every individual will examine. While buyers have multiple choices to look at and can choose to live in an

area where specific resources are accessible, there are some factors about the area that the buyer has no control over but will be affected by. This study aims to examine two area factors and determine if they have an impact on housing prices: area population and public-school locations. In this context, population and (median) housing prices will be organized into ranks of high, medium, and low. Public schools are defined as elementary, middle, and high schools that are supported by public funds as disclosed by the National Center for Education Statistics. Housing prices are organized by zip code and the population is organized by county. Population and public school locations are two area factors outside of the seller and buyer's control, but could still impact house pricing and value. To test the hypothesis that a high population and a high amount of public school locations in an area increase the housing price of the area, the statistics of all three data groups will be visually compared and statistically summarized. Housing prices will be compared to population and then separately compared to public school locations. The results showed some correlation between the two factors and housing prices, proving the hypothesis to be true to an extent. These results show that the statistics suggest a correlation, but not causation when it comes to house price, population, and public schools.

Utilizing Geospatial Analysis for United States Embassy Site Acquisitions

Virtual oral presentation - [Join now](#)

11:00am – 11:15am

Undergraduate Student(s): Andrew Bailey, MaKenna Chambers, Alaina Ellis, Cheyenne Feltman, and Grace Shirley

Research Mentor(s): Uli Ingram

Ideal locations for United States embassies abroad must strike a delicate balance: they must be conveniently located to maximize their utility for Americans abroad, but also meet rigid national security standards. In conjunction with the Bureau of Overseas Buildings Operations (OBO) within the U.S. Department of State, a team of five student researchers, led by Professor Uli Ingram, have been working diligently to find how the use of geospatial analysis can assist in locating suitable parcels of land to serve as sites of future United States embassies around the world. The team has sought to analyze the conditions of a provided list of cities of interest that spans several nations by gathering data on criteria set forth by the OBO. Using both quantitative analysis tools in ArcGIS Pro and qualitative analysis through Google Earth, Google Maps, and local government websites, the team has been able to narrow the scope of site acquisitions searches from entire cities to individual city blocks or parcels. The compiled data for each city has been exported to interactive, searchable web applications through ArcGIS online, providing a convenient means for the OBO site acquisitions team to examine the suitability of any parcels they consider in the future, leaving a lasting impact after the student research is complete. Through biweekly progress updates and demonstrations of geospatial analysis tools, the student researchers have helped guide the OBO's efforts to implement GIS workflows into their current site acquisition process.

Human Impact on Air Quality

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Sage Lupfer

Research Mentor(s): Uli Ingram

Human impact on the world today, through issues such as air pollution and climate change, have become a growing topic as the population and problems continue to increase. This research was conducted to provide data, in the form of maps, to depict how human influence has caused areas from major cities to National Parks within the United States to become highly polluted. With a large portion of the nation believing that air pollution primarily stems from major cities, this research provides a look into the growing issue of air pollution, due to the burning of fossil fuels through sources including agriculture and industrial emissions, within National Parks. The results of the research are used to provide a sense of urgency when it comes to improving the nation's air quality and provide a better understanding of how these issues are arising.

Future Wildfire and Sea-Level Rise Threat to California Families Living Below Poverty

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Yevgenly “Eugene” Aushev

Research Mentor(s): Uli Ingram

The State of California is exposed to multiple climate change impacts with sea-level rise and wildfires being two of main concern. Until recently, the state of California spent much of the time and resources focusing on sea-level rise exposure while devoting very little time studying future wildfire threats. During last couple of years, the state of California has seen devastating fires that impacted communities, wildlife, and the environment. Most of the wildfire impact occurs in rural areas in communities that may not always be equipped to return to normal. This project focuses on demonstrating the fact that future wildfires are predicted to impact counties that have high percent of families already living below poverty level making a “come back” much more challenging. The aim is to draw attention to the need to take action to prepare and adapt these vulnerable communities against future wildfire risks.

Demographic Change in the North Atlanta Metro Area

In person poster - Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Zachary Lloyd

Research Mentor(s): Uli Ingram

The northern Atlanta suburbs are perhaps the premiere destination for migrants, both domestic and international, into the Atlanta Metropolitan Area. Filled with activities, good schools, and endless dining options, these communities are not only relatively safe to raise a family in, but also offer plenty to

do for married couples and retirees. The counties of Gwinnett and Cobb, along with the northern portion of Fulton County (known as North Fulton) are the traditional northside suburban destinations, but growth there has slowed because much of the land is now densely developed. Predictably, the suburbs have extended northward through the counties of Forsyth and Cherokee, and into Dawson County, leading to rapid demographic and population change. Just twenty years ago, these counties were mostly rural and unpopulated, containing very small minority populations and a lack of development. I found that within the past eleven years, population patterns and statistics have changed significantly, with influxes of residents belonging to all major racial and ethnic backgrounds. While Forsyth and Cherokee have ranked among America's fastest growing counties for many years now, Dawson has been thrust into development rather recently. I expect its future population growth patterns will align with those of Forsyth and Cherokee. I am using a choropleth map and two dot-density hybrid maps to display the changes that have taken place.

Veteran Homelessness in the United States

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Tanya Murphy

Research Mentor(s): Uli Ingram

The purpose of my poster is to showcase an on going problem that is experienced in the United States, Veteran Homelessness. The importance of the development of this map is by determining if there are hot spots and if there are any improvements being made in Veteran Homelessness. Ultimately, the goal is developing programs for advocacy that can assist in eradicating homelessness.

COVID-19 in Georgia: Vaccination Rates and Deaths at the County Level

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Marcus Piotrowski

Research Mentor(s): Uli Ingram

From the beginning, COVID-19 has challenged humanities efforts to protect ourselves against this potentially deadly disease. One proven method to fight the virus is vaccination, and several vaccines have been developed with differing degrees of efficacy. Although not perfect, vaccines have been the single most useful tool to date in the ongoing fight against COVID-19. The vaccines are not a cure, nor do they fully protect against infection, but they do significantly reduce the chance of death from COVID-19 or COVID related complications. This project uses publicly available data from the CDC to map vaccination rates, as well as COVID-19 related deaths in Georgia in an attempt to determine whether there is a noticeable correlation between vaccination and deaths at the county level. Analysis of the data as well as map construction was done using ArcGIS Pro to produce choropleth and dot density maps for visual comparison. It has been scientifically proven that vaccination reduces the risk of death

from COVID-19. Mapping this correlation may help to increase Georgia's vaccination rate by providing visual evidence. While visual analysis proves somewhat inconclusive, it none the less gives a clear picture of the effects of COVID-19 and the prevalence of vaccination across the state.

Georgia Cities Along Highway 400 with the Best Living Potential

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): AJ Sherrell

Research Mentor(s): Uli Ingram

This study focuses on how a potential resident of Georgia in the area North of Atlanta may choose the best location in which to reside. This project is narrowed down to five cities along Highway 400 as the study area. The cities are Roswell, Cumming, Dunwoody, Alpharetta, and Sandy Springs. The factors that prospective residents may base their decision on includes three core attributes as follows: the population percentage of each city by census block, typical average commute times of each city, median household income, and average per capita income. This information has been gathered from the U.S. Census Bureau data in 2020 and from Esri's ArcGIS Living Atlas. I chose the area along Georgia Highway 400 because there are quite a few corporate headquarters and regional hub locations along that route. The conclusions drawn from this study can be somewhat subjective, but I plan to point out which city out of these five popular cities may be the most advantageous to live in based on the chosen attributes.

Garbology Among KSU Students

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Kya Brown, Lauren Beech, Dilyn Duffy, and Preslie Waller

Research Mentor(s): Susan Kirkpatrick Smith

Garbology is important because it allows us to understand the type of garbage people are producing which allows us to find ways to minimize this waste. By studying and reviewing each other's garbage, we were each able to analyze and hypothesize the living environments each of us live in. We were able to find out our group members' cultural information by reading the list of garbage in each other's home. Our results showed that it was easy to determine the amount of people in the house, but difficult to determine gender and age. Most of the garbage found was cardboard, which shows the wide use and waste of cardboard in our society today. However, majority of the garbage was also food waste. This paper will outline the ways we can find out about one's culture through their garbage, modern society, and different ways humans could possibly identify with their waste. It will also outline the different types of common waste we were able to identify and possible ways to limit this waste. Garbology helps us understand how archaeology relates to our culture.

Invasive Species in the Chattahoochee National Forest

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Burton Blackmar

Research Mentor(s): Uli Ingram

*The Chattahoochee-Ocoee National Forest is located primarily in northern Georgia, with a smaller location in central Georgia. Due to people bringing foreign plants into Georgia, there are now a multitude of invasive species within the national forest. Pine trees have been chosen to be grown for timber and planted all over the southeast; as such, the southern pine beetle (*dendroctonus frontalis zimmermann*) has spread throughout the national forest. Invasive plants included in the research were kudzu (*pueraria montana var. lobata*), chinese privet (*ligustrum sinense*), english ivy (*hedera helix*), and johnsongrass (*sorghum halepense*). The purpose of the project is to demonstrate which areas of the national forest are most in need of upkeep. By quantitatively showing the areas most affected by southern pine beetles, and qualitatively the areas most affected by invasive plants, the most damaged sections of the national forest can be detected, and further investigation can be conducted. The USDA provided data on the level of infestation, on a county level, of the southern pine beetle. Using their model projection from the 2012 National Insect and Disease Risk Map, I compared it to inside the borders of the national forest to show a percent of the total amount of host trees, using county and national forest borders as the enumeration units. Location based data with the species of invasive plants were compared with a buffer of 10 miles around the national forest to create a map. It was found that some areas of the national forest were more infested with southern pine beetles than others, and it should give an opportunity for further field research.*

Mapping a Suburban Forest Fragment at the KSU Field Station

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Derek Schmidt

Research Mentor(s): Nancy Hoalst Pullen

The KSU Field Station, located two miles from the KSU campus and within a suburban environment, consists of a 25-acre property, some of which is covered by a mixed deciduous forest fragment within a suburban environment. Within the fragment is an established 50mx50m plot. The purpose of our research was to collect baseline data on the composition of the trees in this established forest plot. This firsthand data were physically collected by our research team in the field. Systematic physical measurements of each stem were recorded, including the type of species, diameter at breast height (DBH), geographic coordinates, and notes on the tree's health and condition. The field data were then mapped, showing the composition as oak-hickory-pine dominant, but with other notable species found in the canopy and understory. These data provide a foundation for future studies related to the composition and health of this disturbed suburban forest fragment.

Average Commute Times

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Rebecca Boyd

Research Mentor(s): Uli Ingram

Commutes to and from work are often known to be long and draining. Those in the United States are subjected to averages of 30 minutes or more. This poster discusses the states' average commutes and the relationship between Georgia's population density and average commutes times based on county. The main objective of the poster is to note these relationships for future projects. The relationships were found using data collected from an array of sources: The U.S. Census Bureau, American Community Survey, ESRI, and the EPA. Data such as population density and commute times were gathered and put into a table, then added into ArcGIS Pro, and analyzed based on different qualities. State layers were found as shapefiles from the Census Bureau and added to the maps as well. The results were different based on each map's information; however, there is a correlation between drive times and population density. The results from the poster show how higher population counties are more likely to have a higher commuting average, and states with larger population densities also have a larger commuting average.

Flooding in Charleston

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Ella Hilliard

Research Mentor(s): Uli Ingram

Flooding continues to be a problem in many coastal towns. This project is meant to serve as a guide for citizens in the Charleston area who are interested in buying a house and determining whether they are prepared to live in flood-prone areas. For this purpose, two maps were created based on data collected by the City of Charleston. The first map identifies the Flood Factor Score for areas with above-average housing costs in the Charleston area. Using FEMA flood zones, the Flood Factor Score identifies areas prone to flooding in the near future. The second map focuses on evacuation routes for natural disasters, road closures, and flooded basins. Together, the maps identify the majority of Charleston affected by flooding and provide a valuable guide to prospective homeowners about the safety of the area.

Georgia Power Plants

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Grayson Nardone

Research Mentor(s): Uli Ingram

With the growing population in the United States, the need for public knowledge of Georgia's energy generation is going to be important in future planning of energy infrastructure. The purpose of this study is to show the location of energy-generating plants and show which fuel source each power plant utilizes. Georgia has over 60 power plants scattered around the state. The different fuel sources that Georgia utilizes are natural gas, coal, nuclear, hydroelectric, and biomass. This study will examine the difference in energy output between the different fuel sources of the power plants. The United States Energy Information Administration provides open-source data of energy plants in the United States. Statistics of power plants will be derived from different fuel sources and examine the total megawatt (Mw) output of each fuel source. Understanding Georgia's current energy sources and supply will be necessary for advancements in energy management and developing more reliable energy systems.

Garbage and its Archeological Background

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Ellie Flynn, Forrest Smith, Michael Lawrence

Research Mentor(s): Susan Kirkpatrick Smith

In our project we have been researching garbage and how to analyze and draw conclusions. We have been studying how garbage that is found can be used to determine interesting facts about a person or place. By using this technique, we have been reviewing each of our group members garbage to draw conclusions about each other. By viewing each other's garbage individually we have been able to determine cultural differences, gender differences, and difference in how we each live our daily lives. Most of the garbage found was food waste or paper products used to eat. This made it easy to determine that amount of people living in the house, but difficult to determine age and gender.

Chesapeake Bay Conservation

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Samantha Finch

Research Mentor(s): Uli Ingram

This presentation will present the research of the Chesapeake Bay and areas that surround it. It will focus on the environment and habitats that are affected by the population that reside near the bay. The impact that people have raises concerns for the environment making conservation efforts important.

Georgia State Parks & Historic Sites: How Visitation was Affected by the Pandemic

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Kristen Prince

Research Mentor(s): Uli Ingram

Georgia State Parks and Historic Sites are a great way to explore our states beauty and rich history. They also offer a place for us to socialize, have adventures, and exercise to stay physically and mentally healthy. However, during the Covid pandemic we were asked to quarantine and avoid social interactions. It was thought that because of the quarantine visitation of state parks suffered. Where are the State Parks and Historic Sites in Georgia? Which ones have walking/hiking trails, camping or both? How was visitation of the state parks affected by the Covid Pandemic? These are the questions this project sought to answer with research. Presented will be a map detailing where the State Parks and Historic Sites are in relation to some well-known cities. This map will also show whether walking/hiking trails and/or camping are available at the different locations. There will be a second map showing how attendance was affected by the Covid Pandemic. Visitation data has been collected from the Department of National Resources and Georgia State Parks for June to June of the years 2019, 2020, and 2021. The hypothesis was that visitation had gone down during the pandemic and rebounded after quarantine was lifted. While this was the case at some parks it was found that visitation increased at many parks during quarantine and further increased after it ended. The GA State Parks have a program called Friends of GA State Parks and they have volunteer events that bring communities together to benefit the parks.

Air Quality in Relation to Power Plants, Georgia 2020

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Chase Spotts

Research Mentor(s): Uli Ingram

This poster shows the correlation between air quality and power plants in the state of Georgia. Most individuals are unaware of the amount of pollution that is emitted in their area and this poster will hopefully be an eye opener to how widespread air pollution can really be. AQI (Air Quality Index) readings were examined for the state of Georgia as well as major power plants. Together, these two maps provide evidence of strong correlation between power plants in Georgia and AQI readings in Georgia. These readings were obtained through the EPA (Environmental Protection Agency) website.

Environment and Income

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Camille Prickett

Research Mentor(s): Uli Ingram

The purpose of my research is to examine environmental equality in the United States. What this means is looking at the relationship between marginalized groups and the quantity and/or level of harmful environmental issues in their area. To accomplish this, I used ArcGIS programs to map environmental factors such as the location of harmful power plants (coal, natural gas, nuclear, etc.) and annual Air Quality Index values, and human factors such as median household income. By comparing the data

shown on each map, we can see that not only is there a strong correlation in low air quality and location of power plants, but that there is also a startling lack of air quality data in low-income areas, contributing to the conclusion that there is an overall lack of concern for low-income families residing in environmentally threatened areas.

Proposing Water Clean-Up Projects in Georgia's Low Income Areas

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Cierra Walsh

Research Mentor(s): Uli Ingram

Marginalized communities are disproportionately affected by environmental degradation through a phenomenon called environmental injustice (sometimes referred to as environmental racism as well). This can be observed in the context of many environmental issues, but one of the most prevalent around the world is access to clean, safe water. Georgia is no stranger to this problem, and my aim is to demonstrate the connection between pollution and lower-income communities in Georgia, as well as present potential locations for clean-up projects in low income areas. By comparing maps of the groundwater pollution in Georgia and different average incomes in Georgia's US census block groups, it can be seen that most of the high pollution areas in the state are also areas with lower average household incomes. When looking at a list of Georgia's "Dirty Dozen" (the most polluted bodies of water in the state), it can also be seen that many of them are located in low-income areas. Among these are the Ocmulgee River and the Altamaha River, both of which are consistently on this list almost every single year. I am presenting this information not only to spread awareness for this issue, but also to bring the KSU community together to help clean-up some of these polluted bodies of water in areas that do not necessarily have the means to do it alone.

Melting of the Arctic

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Naomi Raffa

Research Mentor(s): Uli Ingram

This poster will be about the melting of the arctic ice and how it is going to affect certain life that resides there. I decided to pick this topic because I think it is important to address and learn more about the kind of effect it will have on the rest of the world. The whole region has animals and ecosystems that will be destroyed if something is not done to help prevent any more damage. I want to learn more about what can be done to prevent a disastrous outcome and help the life that reside there and teach that to my class. I believe this is unique because as most people know the arctic ice has been melting for many years, many do not know how the impact of this occurrence has on the whole world, and what can happen to our environment. Climate change is no hoax and is crucial to spread data on our declining bionetworks.

My focus will be on yearly reduction of ice and its outcome, as well as how the decline of ice in the arctic has jeopardized the ringed seal. The ringed seal is native to the arctic and has had a decline in population for a number of years. Part of the poster will include a proposed habit for these endangered animals and information about how to help them increase in population. The poster will also include data from numerous credible sources on ice decline during the course of several decades. I want to also mention the different reasonings behind the shrinking of the arctic ice, such as the warming of the planet, greenhouse gases, and the rise of sea surface temperature (SST). I believe this information is valuable and should be presented in an appealing manner to the viewers.

Population and Income Differences of Metro Atlanta

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Andrew Anderson

Research Mentor(s): Uli Ingram

This study examined the population and median income among Asian, Black, and White residents within the immediate Metropolitan Atlanta area. The objective of this project was to determine differences in population and income within these counties, determining if there were any notable disparities. The information studies population and income numbers from 2019 of the U.S. Census via the American Community Survey. The areas of focus are Clayton, Cobb, Dekalb, Fulton, and Gwinnett counties. The population data is represented on a Dot Density map which plots a dot for every 3,000 individuals of the select demographic group. The second map is represented through 3 Choropleth maps, one for each race, which breaks the respective incomes into 3 classifications. The results show that despite the Black population representing a majority portion of the Metropolitan Atlanta area, it is last in median income. While the Asian population has the lowest population numbers representing the highest median income. The White population is significantly higher than the Asian population but is comparable to the Black population. The results of the findings showcase a disparity in median income among Blacks compared to other groups in focus. Examining the causes of such disparity is needed to ensure a more balanced distribution of income.

The Effect of Takeover Performance in Relation to the Volume of Music

In person oral presentation – Room J 381

1:45pm – 2:00pm

Undergraduate Student(s): Kathia Figueroa Morales, Samantha Hutchinson, Autumn Gibson, Johnathan L. Hoggs, Mattie Gordon, Molly Hancock, and Jacqueline Garcia

Research Mentor(s): Kyung Jung

Music provides many drivers with entertainment during their commutes to work or in their daily driving life. With automated vehicles (AV) being on the rise in popularity, one may wonder how music can affect the driver's ability to take over the AV in an emergency. We hypothesized that listening to

music, especially at a louder volume, would decrease takeover performance which is the ability to retake the vehicle in case of emergency. To test the hypothesis, we conducted an experiment using a driving simulator where the participant was listening to music at two different volume levels. We monitored the status of the AV both with and without the planned trajectory that shows the route of the car. This study shows how drivers' takeover response is affected by the different volume levels of music.

Fast Food Affects

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Alexander Hansen

Research Mentor(s): Uli Ingram

My topic is how fast food locations affect the surrounding areas and if they are purposely placed in low income areas. Fast food is everywhere in the united states, you can't go a mile in a town without seeing a fast food restaurant. I am making some maps to see if there is a correlation between fast food and certain demographic factors. One such factor is if the locations of the restaurants are in low income areas. If this is the case that means the low-income communities are targeted by fast food. I am also looking at how obesity rates compare to the fast food locations. Most likely the obesity rates will be higher around the bigger concentrations of fast food. When the project is finished you should be able to see the trends that fast food causes.

An Analysis on the Relationship Between the Location of Cities in Georgia and Average Income by County

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Gavin Smith

Research Mentor(s): Uli Ingram

This analysis is aimed at finding the correlation between two factors. Those are the average GDP by county in the state of Georgia, and the physical location of cities in Georgia. However, the data will be focused on the majority of Georgia and its metro area, excluding much of South Georgia. Using maps and its data as a reference, we can determine the average income among the entirety of Atlanta, surrounding cities, and its suburban neighbors. With this analysis, I will explain the significance of living in cities as it relates to overall earnings. Also, with the correlation found between these two data sets, other factors such as cost of living are considered when reviewing. In short, the purpose of this research is to compare the data and explain the misconceptions of how the data may appear on the map. One is the ratio of earnings vs. expenses and how different areas have different ratios. The way of life in Georgia varies across the state, and Atlanta at the center of the state will be the main focus point.

Gulf of Mexico Dead Zone

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Katie Dunlap

Research Mentor(s): Uli Ingram

When a body of water has less oxygen dissolved, it becomes a dead zone. This dead zone is unable to sustain life due to the low oxygen levels. The Gulf of Mexico has the second largest dead zone in the world. Organizations, like NOAA, have been measuring the dead zone for over three decades. The dead zone of 2021 is the sixteenth largest in the thirty-five years. While dead zones occur naturally, why is this dead zone so large? The answer is simple, the Mississippi River. The Mississippi River is the longest river in the United States and runs through large amounts of agricultural land, along with numerous urban areas. The runoff from these areas flows into the Mississippi River, which flows into the Gulf of Mexico. Due to the currents in the Gulf of Mexico, all of the pollutants from the Mississippi River collect in the area just south of the Louisiana and creates a dead zone. The Gulf of Mexico area accounts for forty percent of the nation's seafood and the growing dead zone is impacting that industry. The population of world is growing, and the mid-west farmlands are having to increase production to keep the people fed. Fertilizers are changing in order to combat drought, insects, and disease, while the pig and cattle farms increase their herd sizes. There must be a solution out there that can allow for the increasing need of food but lower the amount of run-off that is created and washed down into the Gulf of Mexico.

Atlanta Region Food Access: A Study of Food Access as it Relates to Population Growth

In person poster - Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Derek Romanek

Research Mentor(s): Uli Ingram

The Atlanta region is one of the fastest growing regions in the United States of America. With a growing population there is an increase in the demand for resources including food. Food security is a global issue and does not only effect developing nations. To improve sustainability the United Nations came up with 17 Sustainable Development goals. To better understand what we can do to improve sustainability and meet the U.N. goals there is a need to study our local economy. This study aims to focus on census tracts with a high percentage of households identified as being low-income and has low access to food stores with an emphasis on the region's counties that are expecting the greatest percentage growth in the population. Open-sourced geospatial dataset feature layers were acquired from the United States Drug Administration and from the Atlanta Regional Commission. ESRI's ArcGIS programs were used to create a quantitative choropleth map of the percentage population growth from 2015 to 2050 and a qualitative map of food insecurity in the region. The intended purpose of the mapped data is to illustrate where in the region can expect the greatest percentage increases in population juxtaposed to the regions census tracts dealing with current food insecurity issues. The greatest concentration of food insecurity was expected to be in Atlanta, but it is anticipated that there will be greater growth in the

surrounding region. The expected result of this study is to anticipate areas that can expect to see a high percentage increases in the population with food insecurity. When we identify areas in need of food security assistance, we can make more efforts to the improve the well-being of the people in that community.

Gender and Garbology

In person poster – Gymnasium

11:45pm – 12:45pm

Undergraduate Student(s): Olivia Brooking and Mauri Hawkins

Research Mentor(s): Susan Kirkpatrick Smith

In our project so far our group has been able to discover how much you are able to determine about one's environment just from their garbage. We have been researching how you are able to determine how many individuals there may be in a household, how there is little to no difference between female and male waste, and daily events that occur in one's day or week. We came to this analysis from our different assumptions and observations of each other's garbage. For instance, there was no obvious indication of either gender in any of the trash we analyzed.

Maps of Fayette County

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Luke Turkiewicz

Research Mentor(s): Uli Ingram

My goal for my poster is to show contour lines, floodplains, and schools in Fayette County and hopefully familiarize people with the area in Fayette County. I am from Peachtree City which is in Fayette County so I am familiar with the area. I would like to show contour lines and where elevation is higher and lower. I would also like to show where schools are in Fayette County. The schools I will be showing are elementary schools, middle schools, and high schools. I have them marked on my map and colored coded differently for each type of school. I also want to show where there is floodplain(s) in Fayette county. One map will show the schools and where they are in Fayette County. The other map will show where the floodplain and contours are in Fayette County.

Analysis of Drug Use vs Crime Rate in Georgia

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Craig Emmett

Research Mentor(s): Uli Ingram

This project intends to examine the relationship between drug usage and violent crimes in the state of Georgia. Data collected from GBI and the Substance Abuse and Mental Health Services Administration was compiled and using various techniques of ArcGIS pro maps were developed.

Finding Structure & Composition of Southeastern Peri-Urban Forests

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): AJ Williams

Research Mentor(s): Nancy Hoalst Pullen

*Having accurate and up-to-date urban and peri-urban forest inventory data are crucial to understanding and/or predicting the impacts of environmental change. Threats to forest health, including pest infestations, fungal diseases, insects, and invasive species, can be detected, managed and even prevented with consistent inventory and analysis of forests. This is particularly true for urban and peri-urban forests, where human-created disturbances (or lack thereof) influence the composition and structure of the trees. For this study, an inventory of trees within an established forest inventory research plot (50mX50m) at the KSU Field Station was taken from August-October 2021. For each stem, the species, diameter at breast height (DBH) and location were recorded, in addition to any notable abnormalities (e.g., dead wood, cankers, root problems etc.). The most notable finding while working in the established plots was the occurrence of *Castanea dentata* (American chestnut), a species considered functionally extinct. The analysis of the surveyed trees (stem frequency, basal area, and diversity) help answers questions about the composition and structure of peri-urban deciduous forest fragments in the southeastern US.*

California Wildfire Predictions for Future Years

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Garrett Parker

Research Mentor(s): Uli Ingram

My poster that I am presenting is about the prediction of wildfires in the state of California. I sourced data from the internet (Wildlands Fire Management Research) and formatted it into two separate maps and an infographic (pie chart.) I overlaid 20 years' worth of data collect about wildfires across the United States and made inferences and deductions about where potential fires could burn in years to come, and which areas could be safe. Since there are many unpredicted elements that could happen in years to come, this is not an exact prediction, just an approximation. I spent time in ArcGIS Pro to format the data and create these maps to apply to my research and studies. The pie chart shows the percentage of my predictions map that has the potential to burn and is more unlikely to burn. Based on my judgements, a little over half of the state has the potential to burn in years to come. I am not predicting in how many years these areas are predicted to burn, just that they have the capability. Thank you and enjoy!

Garbology Research

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Olivia Williams, Briana Bingham, Anna Appling

Research Mentor(s): Susan Kirkpatrick Smith

At first glance, you would think that people's everyday garbage is nothing more than discarded junk and food waste, but through the research of Garbology, we can analyze trash to see the patterns and habits of humans in their everyday lives. Through our journey, we found out how to analyze trash and come up with hypotheses on who we believe created the trash and how it was accumulated. Our research has further helped us determine that both archaeology and garbology are tied together as they both research past material and determine how it was used and who used it. By looking at each other's trash and collecting information from articles and other reliable sources, we were able to make guesses on the demographics, activity, and number of people within each other's households. We found that we can not particularly tell what types of people created what trash. (i.e race, gender identity, and age) We found how our trash is somewhat similar to one another and came to conclusions on how the households of college students can relate.

The Fundamentals of Garbology

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Gideon Perkins, Diana Mendez-Zambrano, Camdyn George, and Mason Cash

Research Mentor(s): Susan Kirkpatrick Smith

The goal of our project is to help people realize how much trash they are wasting, and we are doing this by analyzing each other's garbage and using other scientific articles for evidence. An interesting fact of our research was the dissonance between what people thought garbage production (both their own and others) looked like, versus what was revealed. Our research led us to understand that people's perceptions of garbage often misalign with the reality of garbage. In our research, we have learned about how analyzing people's garbage can be misleading. For example, if you see a lot of healthy foods in a person's garbage you can assume that they eat exceptionally clean or they are on a diet until you see a half-eaten slice of pizza. Furthermore, we have learned that it is difficult to determine the number of people producing trash. An example of this is from one group member is that it was determined that about five people lived in the household when there were nine. Among the best uses of garbology is that it helps people to realize how much garbage they are producing. Our focus in garbology is to help people realize how much of one food they are wasting, or how certain things that could easily be recycled are just being thrown away. One common themes found in our research is people tend to either have a lot of food in their garbage or little to none. One person in our group had ramen, plastic utensils, and thrown away food, while another group member had dog pills and materials used for doing nails. Our studies

have proven that people have different lifestyles. However, the number of people living in their households reflected the amount of trash that was collected.

Gulf Coast Counties Affected by Major Hurricanes since 2000

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Joshua Rainwater

Research Mentor(s): Uli Ingram

Major hurricanes have impacted communities along the Gulf Coast for as long as there have been people along the Gulf Coast. There are some areas along the Gulf Coast that are more impacted than others though. Hurricanes are categorized 1-5 by the Saffir-Simpson Hurricane Wind Scale. This scale categorizes hurricanes by sustained wind speed. To be considered a “major” hurricane, it must be a category 3 or higher. Major hurricanes can bring intense and costly damage to property and can be potentially life threatening. Since the year 2000, there have been 10 major hurricanes to make landfall on the Gulf Coast. This poster was designed to show which counties along the gulf coast have been affected the most by major hurricanes since the year 2000.

Psychology

Maternal Choices and Outcomes in International Adoption

Virtual poster presentation – [Join now](#)

11:45am – 12:00pm

Undergraduate Student(s): Danielle Podolin, Breanna Barfield, Moriah Boynton, Rachel K. F. Zimmerman, and Alexis Kinard

Research Mentor(s): Nicole G. Martin

As intercountry adoptions rose and then fell, parents made numerous choices as to where to adopt from, the demographics of the child they wanted to adopt, and more. The present study describes the maternal perspective of the choices families made to build their families through international adoption. In selecting a program, couples are choosing a country’s program that accepts their demographics and are also selecting a program that has children that fit the criteria in which they seek. We explored the choices a sample of international adoptive mothers made and how these choices ultimately shaped their families. Following the adoptions of 473 first-time intercountry adoptive mothers, this survey tracked their experience before traveling to adopt and one year after completion of the adoption. Most families chose to adopt children from ethnicities different than their own (84%) and chose based on the sex of the child (52.7%). They brought home children around two years of age at the time of adoption ($M = 21.54$, $s = 23.42$), however there was a wide range of ages chosen. Families that experienced low level of negative feedback prior to adopting internationally reported higher satisfaction a year after the adoption ($F = 19.55$, $p < 0.001$). The majority of the mothers had no regrets regarding the adoption a year after it was

completed (71.3%), however the reasons some reported regret included not being in better financial shape beforehand (5.2%), adopting that particular child (4.8%), adopting an older child (3.5%), and adopting at all (3.5%). This study outlined the choices families made in their pursuit of international adoption and the outcomes that followed these choices.

Adapting Applied Behavior Analysis in Autism Intervention to Improve Individualized Education for Children with Autism

In person oral presentation – Room J 381

1:30pm – 1:45pm

Undergraduate Student(s): Elisabeth Alonso

Research Mentor(s): Jennifer Wade-Berg

Applied Behavior Analysis (ABA) intervention for children diagnosed with autism provides detailed assessments of the clients' abilities and guides skill acquisition with the goal of transitioning the client, often into a typical school classroom. The lack of accessible autism training and access to knowledgeable ABA professionals in school settings prevents teachers from engaging with their students on the autism spectrum. Furthermore, this gap in training does not equip teachers to follow through with the research-based interventions to improve students' quality of life. Teachers must have an understanding of ABA in layman's terms to improve the child's classroom functioning. This research utilizes interviews and content analysis of apropos training intended for parents to create a deliverable in the form of a web-based platform. This platform is designed for teachers to access general ABA concepts in learning modules, find resources for the classroom, and communicate with behavior technicians, parents, and other relevant stakeholders in virtual groups. The features of training include that it is easily understandable, readily available, and assessable for effectiveness using maintenance targets from ABA skill acquisition criteria.

Planned Trajectory Using Augmented Reality on an Automated Vehicle with the Presence of Music
[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Lauren Campbell, Datiel Dayani, Will Attridge, Magan Briscoe, Gabriel Dizon, Emilee Doty, Alyssa Allen, and Kate Caspersen

Research Mentor(s): Kyung Jung

Previous studies have explored the usefulness of various displays of automated vehicles (AVs). However, very few studies have explored the effect of planned trajectory on takeover performance. Previous research has also indicated that music can affect one's ability to drive but has not shown the effect that music may have on takeover performance with a planned trajectory line. Therefore, this study aims to determine whether a planned trajectory line, displayed on the windshield, can improve the takeover performance of drivers while being distracted by music. We hypothesized that music would increase reaction time despite the aid of planned trajectory. To test this, we have conducted an experiment using

a driving simulator and virtual reality headset. Participants had a series of eight trials to test whether a planned trajectory line would improve the takeover performance regardless of the effects of music. We are currently analyzing the data and these results will allow the researchers to illustrate the effectiveness of a planned trajectory line on takeover performance when music is a distraction inside an AV.

Classifying Dogs' Facial Expressions: Implications for Human Cognitive Social Evolution and Cross-Species Communication

Not presenting.

Time Not Applicable

Undergraduate Student(s): Lauren Mitchell

Research Mentor(s): Suma Mallavarapu

Facial expressions have been considered outward expressions of internal behavioral states. Additionally, there is evidence that both dogs and humans subscribe to the social learning theory to acquire contextual information from past experiences in connecting facial expressions to behaviors. Previous research has shown that people are able to read dog facial expressions; however, the research is inconsistent on whether this behavior is innate or learned, as well as if this ability extends to dogs of different facial morphologies. The goal of this study was to understand the extent of humans' ability to read dog facial expressions. First, photographs of dog facial expressions were obtained in positive, negative, and neutral conditions. Second, we recruited 138 college students at KSU and asked participants to identify positive and negative emotions in the dog facial expressions. We collected demographic data, as well as data on experience level with dogs, level of attachment to dogs, level of empathy towards dogs, and knowledge of dog facial expressions to see whether there was a relationship between these variables and accuracy of responses. Understanding how humans read dog facial expressions can provide insight into the evolution of human social communication, not just within our own species, but in other species as well. Additionally, this research can inform owners and dog professionals on dog behavior and emotion and improve the human-animal bond as well as animal welfare.

Projecting Planned Trajectory on an Automated Vehicle via Augmented Reality: Music's Effect on Takeover Performance

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Chesslyn Lamar, Daezha Jackson, Olivia McCoy, Kuma Moore, Alicia Johnson, Corey Hutto, and Nia-Imani Mason

Research Mentor(s): Kyung Jung

Previous studies on human driver takeover performance (reclaiming control from the vehicle) assume that automated vehicles (AV) are able to release a takeover request in a timely manner and we wanted to see what role music had on this. To improve the AV's safety, its windshield includes the planned trajectory to be able to function in the possible absence of the takeover request. We have hypothesized that a driver listening to music with a higher beats per minute (BPM) would have a slower reaction time

when it is time to complete the takeover request to avoid a collision and when listening to a slower BPM the takeover request will happen faster. To test this theory, we conducted a driving-simulation experiment in which participants observed the driving state of an AV while listening to a song that is 160 bpm (Hey Ya!) or 80 bpm (Halo) as well as the projection of the intended trajectory of the vehicle on the windshield. When the song with 160 bpm was played against the song with 80 bpm, the accident rate was higher by # percent and the reaction time was by # m/s according to the results. This study shows how music with higher beats per minute can distract drivers' takeover response in terms of situational awareness with the AV's planned trajectory projected, even when an explicit takeover request has not been released.

Projecting Planned Trajectory of an Automated Vehicle via Augmented Reality: Effects on Takeover Performance While Listening to Music

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): David Nwadike, Armita Safaie, Telai Sharpe, Autumn Shelton, Kyle Vlahos, and Brianna Whatley

Research Mentor(s): Kyung Jung

Previous research on driver's takeover performance suggests that low attention levels may increase driver's reaction time to take over control of the automated vehicle. Previous studies suggest that the presence of lyrical background music leads to significant negative effects on attention. We hypothesize that the presence of upbeat lyrical music while driving will consume the human driver's attentional resources and therefore worsen the human driver's ability to predict the potential crash. This will result in deteriorated take-over performance. To test this hypothesis, we conducted a driving simulator experiment where participants monitored a self-driving vehicle with or without upbeat lyrical music playing in the background. There were a total of eight trials in which the first half was with music, and the second half was without. This study will demonstrate how music affects take-over performance. We are currently analyzing the data, however, we predict that our findings will show a decrease in takeover performance when music is played for participants.

College of Science and Mathematics

Chemistry and Biochemistry

Corrosion Prevention on Aluminum Alloy

Virtual poster presentation – [Join now](#)

2:45pm – 3:00pm

Undergraduate Student(s): Andrea Brenner

Research Mentor(s): Bharat Baruah

Aluminum alloy (Al-alloy) is a widely used metal in construction, aerospace, aviation, and other necessary fields due to its lightweight and tweakable properties. However, corrosion is inevitable on metals and alloys, and that causes millions of dollars of revenue loss every year. Therefore, we propose to research fabricating coating to prevent corrosion on Al-alloy. This study uses an iron-based metal-organic framework (MOF) and polyurethane (PU) based composite coating to prevent corrosion on the Al-alloy. The makeup of the composite material is changed by varying the percentage of MOF. In addition, a binder is also used to enhance the homogenization between MOF and PU. We characterize the coating by FTIR, XRD, UV-visible-DRS, and SEM. The corrosion prevention properties of the coating are assessed using electrical impedance spectroscopy (EIS) and potentiodynamic polarization (PDP).

Repurposing Highly Potent Antiviral Peptide Targeting 3-Chymotrypsin Like Protease (3CLpro) of SARS-CoV-2

In person poster – Gymnasium

11:45pm – 12:45pm

Undergraduate Student(s): Aisha Mohammed

Graduate Student(s): James Stewart

Research Mentor(s): Mohammad A. Halim

Beginning in 2020, the Covid-19 outbreak became a global epidemic by spreading exponentially and affecting millions worldwide. As of October 2021, more than 244 million cases have been confirmed worldwide and nearly 5 million deaths have resulted from the pandemic. Currently, major biopharmaceutical companies like Pfizer and Moderna have created and distributed FDA-approved vaccines to contain the virus. Although the vaccines showed good efficacy and significantly lowered the infection rate, the emerging variants are still infecting millions and killing thousands of people every day. While various small molecules have demonstrated promising results targeting the viral proteases such as the main and papain-like proteases, few studies have been reported for antiviral peptides. 3-chymotrypsin like protease – commonly referred to as 3CLpro – is one of the most promising targets for repurposing small drug molecules and antiviral peptides. In this study, 50 highly potent antiviral peptides that previously exhibited various levels of experimentally proven antiviral activity were selected for repurposing against the main protease of SARS-CoV-2 based on their binding affinities and non-bonding interactions with 3CLpro. These peptides were examined using various bioinformatics tools such as PEP-FOLD, PATCH-DOCK, and FIRE-DOCK. The three-dimensional structures of these peptides were modeled by PEP-FOLD, and subsequent molecular docking and refinement were performed by PATCH-DOCK and FIRE-DOCK, respectively. The binding affinities and activities of these peptides were then analyzed and arranged in a manner such that the peptides with the strongest interactions with His41 and Cys145 (active site residues of the 3CLpro) could be identified. Of the 50 peptides, AVP1987, AVP1006, AVP1005, AVP1832, and AVP0983 presented the highest binding affinities between the ranges of -62.77 and -75.42 kcal/mol. Based on the computational results, we plan to synthesize these peptides and perform their in vitro analysis by FRET-based 3CL-protease assay.

Molecular Dynamics Simulations of Vibrational Infrared and Raman Spectra of H₅O₂⁺

Virtual poster presentation – [Join now](#)

12:00pm – 12:15pm

Undergraduate Student(s): Ivonne Meares and Gabriella Garofalo

Graduate Student(s): Oluwaseun Omodemi

Research Mentor(s): Martina Kaledin

We report infrared (IR) and Raman vibrational spectra of H₅O₂⁺ protonated water dimer using computational chemistry methods, the normal mode analysis (NMA), and molecular dynamics (MD) simulations. Various computational methods and basis sets were used. We also located the H₅O₂⁺ stationary points on the potential energy surface using the Gaussian 16 program. The H₅O₂⁺ Zundel complex serves as a benchmark system to study the proton transfer process. We also investigated IR and Raman intensities of other deuterated analogs, such as D₅O₂⁺, D₄HO₂⁺, and H₄D⁺O₂. Proton transfer frequencies estimated using the NMA method at the MP2/aug-cc-pVTZ level of theory for H₅O₂⁺, D₅O₂⁺, D₄HO₂⁺, and H₄D⁺O₂ were 911.3 cm⁻¹, 660.2 cm⁻¹, 831.2 cm⁻¹, and 719.6 cm⁻¹, respectively. Corresponding CCSD(T)/aug-cc-pVTZ values using the analytical potential energy surface were 861 cm⁻¹, 627 cm⁻¹, 786 cm⁻¹, and 692 cm⁻¹. Proton motion in H₅O₂⁺ yields high IR activities, while OH-stretch vibrations show strong Raman activities. Currently, we are running MD simulations at 100 K and 300 K to obtain IR and Raman spectra. This computational work will provide the baseline information to assess the anharmonic effects in the vibrational spectra.

Impact of the Water Content in the Therapeutic Deep Eutectic Solvents

In person poster – Gymnasium

11:45pm – 12:45pm

Undergraduate Student(s): Noam Lewit

Graduate Student(s): James Stewart and Oluseyi Olawuyi

Research Mentor(s): Mohammad A. Halim

Deep eutectic solvent(s) (DES) are the new generation of greener and more sustainable solvents, formulated by the complex of hydrogen bond in the molecules. The solvents allow us to achieve a significantly lower freezing point compared to its components, an affordable formulation and a technology that is typically formulated to improve the bioavailability of a drug. In this research project, we synthesized an ibuprofen-menthol based therapeutic deep eutectic solvent and investigated how water content affects the structure and dynamics of the solvent. For synthesizing the ibuprofen-menthol DES, 2.0629 g of Ibuprofen and 4.6881 g of menthol were placed in a small breaker to achieve a 1:3 molar ratio. The mixer was covered by parafilm paper and was then heated on a hot plate at temperature of 50 °C with 600 rpm for 30 minutes until a clear liquid was observed. In the infrared spectrum of the DES, a strong C-H stretching is noticed at 2800-2950 cm⁻¹, OH bonds at 3345.57 cm⁻¹ which involves in hydrogen bonding, and a less strong peak for the C=O stretching is detected at 1708.41 cm⁻¹. Raman

spectroscopy results showed that 10% and 20 % of water do not interrupt the ibuprofen-menthol's Raman shift compared to the pure DES, however, significant change is observed while 30% and 40 % water were added to the system.

Binding Affinity and Interaction of SARS-CoV-2 Epitopes with Major Histocompatibility Complex

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Sareena Kandavalli

Graduate Student(s): James Stewart

Research Mentor(s): Mohammad A. Halim

*SARS CoV-2 has been affecting the world since 2019. It caused 245 million cases of infection and around 5 million deaths worldwide. The most important strategies for the development of vaccines against SARS-CoV-2 are inactivated or weakened virus, replicating or non-replicating viral vector-based approaches, DNA, RNA, virus particle like approaches and epitope-based approaches. The epitope-based approach is rapid, accurate, cost-effective, and reliable against pathogens. By presenting epitopes (antigen peptides) on antigen-presenting cells (APCs), the major histocompatibility complex (MHC), also recognized as the human leukocyte antigen (HLA) system in humans, plays an essential role in triggering T-cell immune responses. The focus of this study is to identify the binding motif of the epitopes generated from the structural proteins such as spike, membrane, and nucleocapsid of SARS CoV-2 with the MHC. Two HLAs including HLA-DQ and HLA-A*30 were considered for this study. The three-dimensional structure of the epitopes was modelled by the PEP-Fold server. All the three-dimensional models of the epitopes have extended alpha-helix structures with short-coiled C-termini. The interactions of these epitopes with the MHC complexes were noticed. Using a molecular docking approach, the binding affinity and non-bonding interactions between the MHC and epitope were measured and identified by PATCH-DOCK and FIRE-DOCK. In HLA-DQ, the epitopes showed binding affinities ranging from -36.58 to -82.31 kcal/mol, whereas in HLA-A*30 all epitopes showed comparatively lower binding affinities, ranging from -34.90 to -59.78 kcal/mol. Some of the epitopes were accurately bound to the residues in the peptide-binding grooves of HLA complex while some were in the vicinity of the binding site. Our results can provide more understanding of HLA supertypes and pave the way for SARS-CoV-2 epitope screening and vaccine development based on the binding motifs of different supertypes.*

Analysis of Kavalactones in Various Consumptive Kava Samples using GC-MS

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Stephanie O'Kon

Research Mentor(s): Wei Zhou

Piper Methysticum, or Kava, is a plant native to the Pacific Islands and is used in various ceremonial and cultural aspects. In the United States, Kava has many dietary forms from sleep aids to mood boosters. The active ingredients found in Kava roots, kavalactones, give users psychoactive effects. However, there are concerns regarding toxicity and unknown safety consumption limits. There are six major kavalactones, and possibly more that have been reported, but not fully researched. The one of interest in this study is kavain. Different solvents, diethyl ether and acetone, have been used in extracting kavalactones from cut kava root. Utilizing GC-MS, an elution process of 20 minutes has been developed to separate the major compounds. The chromatograms from acetone extract gave clearer peaks kavain at retention time of 13.5 minutes. Standard solutions of kavain from 25-500ppm in acetone are being used to construct a calibration curve at optimized conditions for GC-MS parameters. Quantitative measurements of kavain will be performed to calculate their concentrations in different kava samples including dietary kava tea, kava sleeping pills, and kava root extract. This quantitative analysis of kavalactones will help consumers make informed decisions on their daily intake.

Snake Venom Peptides and Toxin targeting the Main Protease of SARS-CoV-2

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Breauna Strawder

Graduate Student(s): James Stewart

Research Mentor(s): Mohammad A. Halim

The coronavirus began to spread in Wuhan, China which caused it to spread worldwide creating a global pandemic in the beginning of 2020, infecting over 243 million and killing over 4.5 million people worldwide. Significant efforts were made to produce vaccines against the virus, which led the recognition of a few vaccines that has been approved by FDA. These vaccines, Pfizer-BioNTech, Moderna and Johnson & Johnson, which all have efficacy against Covid-19. Despite having vaccines, COVID-19 is still present and infecting millions and killing thousands of people every day. Multiple therapeutic options would allow us to slow down or even stop this pandemic. Snake venom peptides are known to have antiviral and antimicrobial properties. In this study, we have performed computational screening of well-known venom peptides OHCATH (KF-34), Cathelicidin (BF-30), Lycotoxin I (IL-25), and Lycotoxin II (KE-24) as well as 50 venom and toxin peptides against the main protease (Mpro/3CLpro) of SARS-CoV-2. The 3CLpro protein acquired attention because of its crucial role in post-translational processing of replicase polyproteins and viral replication. The venom and toxin peptides contain 7 to 34 amino acids. These peptides were modelled using PEP-Fold where sequence was used as an input. To perform molecular docking between 3CLpro and peptide, initially PATCH-DOCK was used. The clusters obtained from PATCH-DOCK were further refined by FIRE-DOCK. The Peptides with the highest binding affinity also interact with the active site residues such as His41 and Cys145. Cathlecidin (BF-30), Lycotoxin I (IL-25), and Lycotoxin II (KE-27) displayed the highest binding affinity ranging from -63.73 to -41.28 kcal/mol. Various nonbonding interactions such as hydrogen bonding and hydrophobic interactions are detected in peptide-3CLpro complexes. The best

peptides will undergo molecular dynamics simulations followed by protease assay and native mass spectrometry experiments.

Analysis of Halls and Ricola Lozenges Via Multiple Parameter Manipulation, Dissolution Kinetics, and Statistical Evaluation

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Peter Williams

Graduate Student(s): Zeljka Zec

Research Mentor(s): Marina Koether

Lozenges are solid intraoral dosage forms intended to slowly release the active pharmaceutical ingredient (API) into the oral cavity. Aspartame is one of the most common artificial sweeteners found in many sugar-free lozenges to mask the bitter taste of the API. The two lozenges of focus are Halls™ and Ricola™. While aspartame is not the API, its dissolution rate can be used to monitor the dissolution of any API from a solid lozenge. Dissolution studies performed will measure the amount of lozenge dissolved versus time while different parameter changes such as stirring rate, temperature, dissolution media, and different pH are applied. The effect of increased ionic strength and hydrogen bonding solvents will also be analyzed. Kinetic parameters such as activation energy, zero and first order kinetics, and dissolution rate constants will be determined. Additionally, Hixson-Crowell, Higuchi and the Korsmeyer-Peppas methods will show further statistical results. In the future, these dissolution parameters and kinetics will be compared with U-HPLC quantification of Aspartame.

Pilot Study Exploring the Impact that Laboratory Instruction has on a Student's STEM Professional Identity

Virtual poster presentation - [Join now](#)

1:15pm – 1:30pm

Undergraduate Student(s): Datiel Dayani, Amjad Alkawam, and Emma Pearman

Research Mentor(s): Michelle Head

STEM professional identity serves as one lens through which researchers have used to study factors that influence achievement in chemistry courses and persistence in a STEM major. The literature has proposed that the high attrition rate among STEM majors may result from the student's evolving professional identity, motivational factors, and how they correlate a STEM career to their future aspirations. There is limited insight into how laboratory classes and teaching practices affect a student's professional identity development. To investigate this, this study employed James Marcia's identity development theory to understand the relationship between a student's identity status and their perception of laboratory instruction in a first-semester Organic Chemistry Laboratory course. The course was selected for the research context since, unlike General Chemistry, this lab presents new challenges for students with regards new content, laboratory methods, and instrumentation. A mixed methods research design utilized the Meaningful Learning in the Laboratory Instrument (MLLI),

Professional Identity Status Questionnaire (PISQ-5d), and a semi-structured interview. Results from each data collection method will be presented and shown how they were triangulated to allow the researchers to draw their overall conclusion of this study. In addition, the findings will aid in providing suggestions for how organic chemistry laboratory instruction may be changed to aid in further development of a student's STEM Professional Identity.

Effects of Coagulation on Turbidity in Water Treatment

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): David Grygorenko

Research Mentor(s): Marina Koether and Amy Gruss

Microplastic coagulation has become of special interest in the drinking water treatment industry in the last decade as the plastic pollution of various aquatic environments persists. Drinking water treatment plants employ coagulation, flocculation, and filtration to significantly decrease microplastic concentration. This project used a jar test procedure which imitated coagulation methods used in treatment plants to study the effective amount of coagulant (Aluminum) needed to achieve the lowest possible turbidity. Results revealed that higher potassium chloride amounts required an increase in coagulant dose to achieve a low turbidity; and an initially higher turbidity was observed with a higher kaolin amount present but no increase in coagulant dose was needed to achieve a low turbidity. Adding pristine thread or weathered thread or lead-laden weathered thread required an increase in coagulant dose to have a low turbidity.

Cell Penetrating Peptide Inhibiting the Main Protease of SARS-CoV-2

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Adam Ashley

Graduate Student(s): James Stewart

Research Mentor(s): Mohammad A. Halim

As of October 2021, SARS-CoV-2 has infected over 244 million people and killed about 5 million people. The current FDA approved vaccines are effective; however, they lose their effectiveness after a few months of receiving both doses of the vaccine, and it is recommended to get a booster shot six months after receiving the second dose of the vaccine. Therefore, new highly effective, long lasting antiviral agents and strategies are needed to create an alternative treatment for SARS-CoV-2 and the different variants. Previous studies have shown that cell penetrating peptides (CPPs) have led to greater efficiency of intracellular delivery. However, no study is reported whether these peptides can be used to inhibit the viral proteins of SARS-CoV-2. The focus of this study is to identify cell penetrating antimicrobial peptides that have the most desirable binding affinities and interactions against the main protease of SARS-CoV-2. To identify these affinities and interaction, computational methods were employed. Peptides' structures were modelled by PEP-FOLD. Molecular docking and refinement were

respectively performed by PATCH-DOCK, and FIRE-DOCK. Peptides with the highest levels of binding affinities and interactions with the active site residues of HIS41 and CYS145 were selected as the best candidates. Of the peptides being tested, R6/W3, gH625, GALA, and TP10 have shown the highest binding affinities against the main protease ranging from -45.58 to -55.58 kcal/mol. These peptides will be synthesized, and in-vitro experiments will be performed by FRET based 3CL-protease assay.

Ecology, Evolution, and Organismal Biology

Comparing Allelochemicals of English Ivy and Native Georgia Plants

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Rebecca Senft

Research Mentor(s): Matthew P. Weand

English Ivy (Hedera helix L.) is a common invasive plant causing biodiversity losses across the southeast and parts of the northwestern US. The mechanisms by which Ivy invades native ecosystems are not well understood but may include allelopathy, a process through which one species produces biochemicals that disrupt competitors. These biochemicals are often produced and exuded by roots into soil, making them difficult to isolate. This study used a soil-less hydroponic system and gas-chromatography mass spectroscopy to examine differences in the chemicals produced by roots of native Georgia plants and English Ivy. Our results suggest there are differences in the diversity and abundance of root exudates produced by English Ivy compared to the exudates produced by the natives of Georgia's forests.

Live Fast, Die Young: Examining Pace-of-Life Syndrome in European Starlings (Sturnus vulgaris) across an Urbanization Gradient

In person poster – Gymnasium

1:00pm – 2:00pm

Graduate Student(s): Rachel Kaplan

Research Mentor(s): Sarah Guindre-Parker

Our planet is becoming increasingly urban, which has significant implications for the future success of avian populations worldwide. The pace-of-life syndrome (POLS) hypothesis seeks to explain differences in physiological, behavioral, and life-history traits among wildlife populations whereby urban individuals rely on a slower pace of life strategy compared to rural individuals. Thus, rural birds are often hypothesized to live fast and die young compared to their city-living counterparts. A slow pace of life is thought to be associated with a number of phenotypes including long adult lifespan, reduced investment in reproduction, thorough exploratory behavior, greater stress reactivity, and greater investment in immune defenses. Since the introduction of this hypothesis, a growing number of traits believed to have evolved in concert as a function of habitat constraints have been added to the body of POLS research. Under the assumptions of POLS, coevolution of these many traits should be shaped by

similar environmental cues, resulting in a predominantly fast or slow life-history strategy under different environments. This proposed research project will require quantification of multiple physiological, behavioral, and life-history phenotypes in different populations of European starlings (Sturnus vulgaris), an invasive songbird species found along an urban-to-rural gradient, to better understand the relationship between POLS and urbanization. The study will aim to address three main hypotheses: (1) urban starlings will display a slower pace of life than their rural conspecifics, (2) suites of behavioral, physiological, and life-history traits will covary across an urban-to-rural gradient, and (3) correlations between related traits will be stronger/more significant in urban starlings.

Cuticle Variation in Striated Genera of Ants

Virtual oral presentation – [Join now](#)

1:45pm – 2:00pm

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 functional morphology. In this study, we explored a consistent cuticle pattern called “striate” that is hypothesized to alleviate cuticle abrasion against ant digging. This pattern can be seen across many ant genera. We collected ridge width and interr Ridge width measurements of 219 species of ants to investigate if any trends occur in cuticle spacing. Trends may help explain the purpose of these unique patterns and provide possible bio-inspiration.

Setting Up a Study to Investigate the Impact of Removal of Understory Species on the Soil Bacterial Microbiome of a Longleaf Pine Restoration Site

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Isabella Vahle and Sean Davis

Research Mentor(s): Paula Jackson

The longleaf pine (Pinus palustris) ecosystem is one of the most diverse ecosystems on the planet. For thousands of years, this ecosystem was maintained by fires and spread from the Carolinas all the way to eastern Texas and down through Florida. Today, only 3% of the ecosystem remains, and only 0.01% of that is untouched land. Restoration of the longleaf ecosystem has been of interest because of its economic importance and high ecological diversity. In this study we propose to investigate the effect of removing of two grass species on the soil bacterial microbiome of the longleaf pine restoration site. These grasses

are thought to have major effects on the overall maintenance of the ecosystem; they contribute to the spread of forest fires which helps clear the understory and makes it possible for longleaf pines to dominate the savannah. We have surveyed the vegetation and set up six randomized blocks, within each of which we will have four subplots with the following treatments: 1) control; 2) dominant grass removal; 3) second most dominant grass removal; 4) soil disturbance with no grass species removal. In this study we will present our methodology to study the effect of the removal of the two grass species on the bacterial community of the area under restoration. We expect that results from this project will provide baseline data to help inform and improve restoration practices for the longleaf pine.

Biological Evolution of Voltage-gated Calcium Auxiliary Subunits

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Alexis Rumbaugh

Research Mentor(s): Tsai-Tien Tseng

Ion channels are critical for the maintenance of homeostasis. Due to the importance, ion channels are highly regulated and can be regulated in different ways. One of the ways to regulate ion channels is through voltage-dependence. Voltage-gated ion channels change their conformation based on the voltage. These types of ion channels also associate with auxiliary subunits to modulate the ion channel activities. Voltage-gated calcium channels are recent interest for potential therapeutic treatment of various physiological reason like pain or cancer. The auxiliary subunits of the voltage-gated calcium channels are potential targets to block the entry of calcium ions into specific cells. With a growing interest in these auxiliary subunits, a better understand of the evolution of the auxiliary subunits and their functions is called for. We used the Basic Local Alignment Search Tool (BLAST) to find homologous structure for the known auxiliary subunits. In comparison to the previous studies in 2018 and 2006, each auxiliary subunit has a greater number of sequences. γ 2,3,4,5,7, and 8 subunits had 29,787 of sequences. Using the large number of sequences, we were able to develop a pedigree tree. The large number of sequences allowed for us to have a better idea of the evolution of the auxiliary subunits.

Bird Behavior in the City: Is Flight Initiation Distance Shorter in More Urban Trails?

In person poster - Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Jamie Riddle

Research Mentor(s): Sarah Guindre-Parker

Across the country and worldwide, urban areas continue to expand and encroach on previously wild habitats. Urbanization can affect animal behavior as organisms respond to the changes in their environment which they may perceive as stressors. Previous studies have noted that birds in more urban areas tend to have shorter flight initiation distances than those in more rural areas, which is defined as the distance at which a potential threat (here, a human observer) can approach before the animal flees.

*This study examines whether flight initiation distance changes along the urban to rural gradient in two species of bird (*Cardinalis cardinalis* and *Mimus Polyglottos*) in Georgia, USA. A single person walking towards the bird was used to stimulate flight as a disturbance. Birds along urban and rural trails were assayed to test whether perceived threats lead to a shorter flight initiation or shorter distance fled in bold urban birds compared to shy rural ones.*

Mathematics

t-Stack Sorting on the Permutahedron

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Cameron Lowe, Justin T. McClung, Robert Shipp, and Heather Willis

Research Mentor(s): Julianne Vega and Andres R. Vindas-Melendez (UC Berkeley collaborator)

In 1968, Knuth introduced the stack sorting algorithm which attempts to chronologically sort an inputted sequence, in our case a permutation. Using the stack sorting algorithm, we traverse the vertices and edges of the permutahedron. The n -permutahedron is the $(n-1)$ -dimensional polytope generated by the convex hull of permutations of the first n natural numbers. We consider subpolytopes of the permutahedron arising from the convex hull of sequences generated by iterations of the stack sorting algorithm. For a particular family of subpolytopes, we determine their dimension and prove that they are simplices. We conjecture that this family of simplices has Ehrhart polynomials with coefficients in Pascal's triangle.

Environmental Impact on Competition in Ecological Communities

Virtual oral presentation – [Join now](#)

11:00am – 11:15am

Undergraduate Student(s): Isabel Ouko

Research Mentor(s): Glenn Young

We study the effects of environmental feedback on 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 XPP to study the bifurcation structure of our model.

Variational Problems for the 2D Maxwell System

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Jessie Chen

Research Mentor(s): Eric Stachura

Partial differential equations are used to model many physical phenomena and the Maxwell system of equations is a system of partial differential equations that model electric and magnetic fields that come from electric charges and currents. In my undergraduate research guided by Dr. Eric Stachura, we explore how a solution of the Maxwell system is affected by the geometry of the problem. In this presentation, I will talk about the progress that was made during this undergraduate research project and how this experience has shaped me as a student researcher.

Mathematical Modeling of Birth/Death Dynamics Among Obligate Cooperative Breeders

In person poster presentation – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Suzan Manasreh and Michaela Crego

Research Mentor(s): Glenn Young

*Cooperative breeding is a social system in which unrelated individuals provide care to the offspring of others within the social group. The avian species superb starlings (*Lamprolornis superbus*) are an example of such cooperative breeders. Every breeding season, each bird adopts one of three roles: breeder, helper, or non-breeder-non-helper. We developed a mathematical model to study the birth/death dynamics of this breeder-helper subsystem within this species. Our model includes variables to represent the breeder and helper populations and incorporates the effects of natural death, role transitions, carrying capacity, and reproduction. We use our model to study the effects of changing different parameters on the population dynamics of the superb starlings.*

Molecular and Cellular Biology

Knockdown of the PRC2 Complex Rescues Developmental Defects Caused by Inappropriate Inheritance of Histone Methylation in C. Elegans

In person oral presentation – Room M 132

11:00am – 11:15am

Graduate Student(s): Sydney Morgan

Research Mentor(s): Brandon Carpenter

*Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in *C. elegans*, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-*

5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. Work from the Strome Lab showed that the Polycomb Repressive Complex II (PRC2), which includes the H3K27 methyltransferase, MES-2, antagonizes MES-4 to maintain proper gene expression during early embryogenesis. This data hints that in the absence of SPR-5; MET-2 maternal reprogramming, MES-2 may prevent a more severe developmental delay by antagonizing MES-4. To test this hypothesis, we knocked down MES-2 using RNAi and found that the developmental delay in *spr-5; met-2* mutants is completely rescued. This exciting result suggests that H3K27me may contribute to MES-4 germline gene misexpression in the somatic tissues of *spr-5; met-2* mutants. We are currently performing RNA-seq and ChIP-seq experiments to further examine how these histone modifying enzymes cooperate to regulate proper germline versus somatic gene expression. Our work will provide mechanistic insight into how developmental abnormalities arise in Sotos and Kabuki Syndrome patients suffering from mutations in these same enzymes.

Bacterial Eaters Kill Salmonella and Shigella

Virtual poster presentation – [Join now](#)

2:45pm – 3:00pm

Undergraduate Student(s): Rana Damaj, Hedy Trejo, Rodrigo Paramo, and Simone Dakare
Research Mentor(s): Jean Lu

Salmonella and *Shigella* are well-known bacterial pathogens that frequently cause foodborne diseases. 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. It is urgent to effectively control of these pathogens in food systems. Bacteriophages (phages) are “bacterial eaters” that kill bacteria. Phages have emerged as promising biocontrol agents against bacterial pathogens because 1) they can cause rapid bacterial death, 2) they do not replicate in foods unless their bacterial hosts are present, 3) they do not infect humans and other animals, and 4) they do not alter food color, odor, taste, and nutritional value. This project partially characterized two phages (Φ Ent and Φ Shig-Tf) infecting *Salmonella* and *Shigella*, respectively. Specifically, we measured the host ranges and 1- step growth curves of the 2 phages and evaluated the thermal stabilities of Φ Ent and its host in Tryptic Soy Broth. Φ Ent showed very broad host range infecting 11 *Salmonella* strains and 3 *Shigella* stains tested. Φ Shig-Tf is able to infect 2 *Shigella* strains, *Escherichia coli* O157:H7, and *Enterobacter cloacae*. The burst sizes of the two phages are about 100 phage particles per infected cell. Φ Ent and its *Salmonella* host were stable at 50°C for at least 4 min. However, Φ Ent was less sensitive to 63°C and 72°C than its host at the same temperatures. This project provided important information for evaluating the potential of the two phages as biocontrol agents in food system.

Myxobacteria in Acidic Environments

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Zaid Abuimweis and Gavin Treadaway

Research Mentor(s): Ramya Rajagopalan

Myxobacteria are Gram-negative predatory bacteria primarily found in soil. Using gliding motility, Myxobacteria work as a pack to locate and attack their prey using lytic exoenzymes to kill the prey for nutrients. However, when no nutrients are available, this can cause the formation of fruiting bodies and spores to help with the survival of the bacteria. Previously, Myxobacteria have only been isolated in biomes of neutral pH and they were believed not to thrive in acidic soils. In this experiment, we collected forty-eight soil samples from two different biomes, forest and savannah, from the Sheffield wildlife management area. These biomes have a very acidic soil pH (between 4.5 to 5.5). We screened the soil samples by PCR using primers specific to the 16S ribosomal RNA genes of two Myxobacterial sub-orders: Cystobacterineae and Sorangiineae/ Nannocystineae. After we ran these tests, many of the samples tested positive indicating Myxobacterial presence in both the forest and savannah biomes which in our case have an acidic pH. We have thus far successfully isolated two wild myxobacteria from these biomes. These new species of myxobacteria could possibly perform differently in its more acidic environment perhaps with different predation capabilities.

Comparing Screening Methods for Detection of Mycobacterium Tuberculosis Complex in Ancient Skeletal Samples

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Ariel Owens

Graduate Student(s): Daisy McGrath

Research Mentor(s): Tsai-Tien Tseng

This interdisciplinary study aimed to compare screening methods for detection of Mycobacterium tuberculosis complex (MTBC) and examine the suitability of these bioinformatics pipelines in anthropological studies. This study analyzes skeletal samples from 28 Polish individuals in the Neolithic period under PRJNA422903 from the Sequence Read Archive (SRA). These individuals showed bone lesions that are consistent with tuberculosis. Identification of pathogens from complex samples relies heavily on methods in bioinformatics after next-generation sequencing (NGS). Environmental contamination and spurious identification of pathogens based on fragmentary data are some of the drawbacks of NGS screening methods that can lead to incorrect epidemiological conclusions. The importance of analytical tools that can provide less ambiguous answers to questions of identification and differentiation of bacteria from the MTBC in ancient data cannot be downplayed. After adapter trimming with Trim Galore!, Kraken2 was used for taxonomic classification with custom-built databases for this study. Our methods revealed additional species of MTBC and Mycobacterium avium complex (MAC) that were previously unreported by the originator of this dataset, including Mycobacterium tuberculosis XDR1219 and Mycobacterium avium hominissuis. Our established

bioinformatics pipeline has therefore been more effective than previously published screening methods and it is suitable for other studies in anthropology and paleopathology using NGS technologies.

Studying Gut Microbiota Effects on the Drosophila Host

In person oral presentation – Room M 132

10:30am – 10:45am

Undergraduate Student(s): Natasya Tamba, Stephanie Sam

Research Mentor(s): Anton Bryantsev and Melanie Griffin

*Emerging evidence has indicated that the gut microbiota, a community of microorganisms living in the gastrointestinal tracts of humans and animals, can influence a host's health. Such impact plays a role in rising widespread health conditions such as type II diabetes and obesity. This study aims to establish a traceable model to analyze the effects of the gut microbiota by utilizing the fruit fly (*Drosophila melanogaster*) as a host. First, we were able to create flies without microorganisms in their guts (axenic flies). While axenic flies can survive and reproduce normally as non-axenic flies, they exhibit a notable developmental delay that prolongs the larval and pupal stages of their life cycle. Next, we restored the normal developmental rate of axenic flies by employing probiotic bacteria. We have isolated two bacterial strains from yogurt for these experiments, identified as *Lactobacillus paracasei* ss *paracasei* and *Lactobacillus casei*. Gnotobiotic flies inoculated with either of these bacteria developed significantly faster than axenic flies. Our study underscores that the gut microbiota has a measurable effect on the host and demonstrates that these effects can be species-specific. Our future goals intend to apply this model to investigate the effects of the gut microbiota on metabolically impaired fly mutants to identify microbiota-sensitive genetic mutations.*

Identifying Gut-Friendly Bacteria from Yogurt for Drosophila Colonization Study

Virtual poster presentation – [Join now](#)

11:45am – 12:00pm

Undergraduate Student(s): Stephanie Sam and Natasya Tamba

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. Moreover, can we get a model organism such as the common fruit fly, *Drosophila melanogaster*, to carry organisms that have been engineered for bioremediation purposes. In order to populate the gut of the fruit fly with one of our interest, flies must first be grown "germ free" (axenic). Initial studies carried out by the joint labs of Bryantsev (fly work) and Griffin (bacteria work) to isolate a fly microbiome organism yielded slow growing and uncooperative bacteria. In this project, we turned to yogurt for more friendly and perhaps adaptable organisms for the colonization. We have successfully generated pure*

cultures for several candidate organisms and conducted genomic extraction for genetic identification by DNA sequencing. We have also conducted biochemical profiling and identification and tested them for antibiotic susceptibility. Transformation of these microbes is currently underway.

Development of a SARS-CoV-2 Surveillance Test for Kennesaw State University

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Eric Brosius

Research Mentor(s): Michael Beach

SARS-CoV-2, the causative agent of COVID-19, is shed in the feces of individuals with either symptomatic or asymptomatic infections. It has been demonstrated that its detection in wastewater precedes clinical diagnosis of new COVID-19 cases in the same community by approximate 7 days. Thus, wastewater detection of SARS-CoV-2 is now being viewed as a potential leading indicator of community infection. Many universities throughout the United State have begun their own COVID-19 surveillance projects to aid in monitoring, tracking and screening for infections on their campuses. Our goal was to develop a rapid protocol for sampling wastewater and subsequent testing of SARS-CoV-2 from wastewater samples on our campus. To achieve this, we used a modified PEG-Salt precipitation method to concentrate the virus from wastewater samples. After concentration, we used a commercially available kit to isolate viral RNA. The purified RNA was quantified by RT-PCR using two primer sets specific for the N gene of SARS-CoV-2 provided by the CDC. We found that our precipitation, RNA purification, and RT-PCR protocols all performed as well as or better than what has been previously reported. We have now completed the development of a molecular-based surveillance test for the presence of SARS-CoV-2 virus on the Kennesaw State campus that could be utilized at any time. Additionally, our protocols could be easily modified to monitor for other viruses or variants of SARS-CoV-2 found in wastewater in the future.

Cracking the Code for Intranuclear Trafficking: Unlocking Bruno Protein

In person oral presentation – Room M 132

10:45am – 11:00am

Undergraduate Student(s): Shania T. Kalladanthylil

Research Mentor(s): Anton Bryantsev

Despite the lack of internal membranes, the cell nucleus is neatly organized into various kinds of defined territories with sharp boundaries, termed nuclear domains (NDs). Each ND type accumulates specific nuclear proteins and maintaining the harmony of this protein traffic is vital for the proper functions of nuclear regulatory machinery. Studying the code of intranuclear trafficking and sorting is posed to enable better control over the nuclear functions for research and biotechnological needs. Our research model was based on B-bodies, the recently discovered NDs from the Drosophila muscles. One of the resident proteins of B-bodies, Bruno, is composed of three RNA-binding motifs (RRMs) and two

internally disordered regions (IDRs). We applied experimental genetics and mutagenesis to isolate the essential protein sequence required for accumulation into B-bodies. All mutant sequences were tagged with green fluorescent protein (GFP), and their accumulation in B-bodies was evaluated by immunofluorescence. After analyzing 9 mutants, we have identified the minimal sequence for trafficking to B-bodies, which consists of two RRM and one IDR domains. Our data suggest that RNA binding ability is key to the specificity in ND trafficking. In the future, we could use this knowledge as a blueprint for modifying nuclear proteins that can safely navigate intranuclear traffic by adding a B-body tag to drive excess of proteins of interest to B-bodies

Analysis of Pseudomonas Aeruginosa Predation by Myxococcus Xanthus Using Confocal Microscopy

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Jon Levesque

Graduate Student(s): Sarah Beauvais

Research Mentor(s): Ramya Rajagopalan

Myxococcus xanthus is a predatory bacterium that utilizes social interactions to hunt and digest prey bacteria. These bacteria swarm towards prey when they encounter them and they lyse the cells to absorb nutrients. Myxococcus xanthus also have another unique behavior that in hostile environments they can form spores within fruiting bodies to help to keep the cells alive until nutrients reappear. Pseudomonas aeruginosa is a gram-negative bacterium that is an opportunistic pathogen. This bacterium is a very common cause of nosocomial infections which include sepsis, urinary tract, surgical site, and chronic lung infections. Pseudomonas aeruginosa utilizes quorum sensing to communicate allowing it to grow and cause damage in humans with compromised immune systems. Within Pseudomonas aeruginosa species there are various strains that are resistant to multiple antibiotics which can cause severe complications in hospitalized patients. If we find ways to interrupt the biological processes of Pseudomonas aeruginosa that lead to infection this could help save countless lives from life-threatening nosocomial infections. Confocal Microscopy is a form of light microscopy that can help generate high resolution images. This is useful because we can use this microscope to look at fluorescent images of Pseudomonas aeruginosa to track live vs dead cells during myxobacterial predation. This would be done by using a mixture of SYTO-9 and propidium iodide dyes. SYTO-9 dye makes the cell fluoresce green when alive. When the cell is dead the red dye propidium iodide is absorbed through the disintegrating cell envelop into the cell making the cell fluoresce red. Investigating cell-to-cell interactions during predation of P. aeruginosa by Myxococcus xanthus could potentially lead to a new mechanism to combat Pseudomonas infections.

From Molecules to Ecosystems: Variation in Metabolic, Chemical, and Physical Characteristics of the Longleaf Pine Soil Ecosystem

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Gavin Treadaway, Zaid Abuimweis, Isabella Vahle, and Ian Thomasson

Research Mentor(s): Ramya Rajagopalan, Nicholas Green, Heather Sutton, and Paula Jackson

The longleaf pine is an endangered species of tree that once covered ~90 million acres of land and 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 of soil microbiomes in different biomes and distances within the biomes using BIOLOG EcoPlates. Additionally, we collected data on the chemical and physical makeup of the soil of the microbiome. We probed this data for information on the relationship between metabolic, chemical, and physical profiles of these samples to identify relationships that can better our understanding of the intricate relationship between the microbiome and the surrounding soil.

Physics

FTIR Study of Extracted Nanoceria From A Soluble Glass

Virtual oral presentation – [Join now](#)

10:45am – 11:00am

Undergraduate Student(s): Angel Vasquez

Research Mentor(s): Kisa Ranasinghe and Rajnish Singh

Cerium Oxide nanoparticles have been of interest for many years due to its possible applications as an antioxidant that give it properties to scavenge toxic radicals found in neurodegenerative diseases, Cancer, Alzheimer's, and inflammatory conditions. What gives Cerium Oxide nanoparticles their antioxidant property is the coexistence of Ce^{3+} and Ce^{4+} . Cerium has two partially filled subshells that allow for several excited states. Our research group has created a soluble sodium borate glass composition doped with varying amounts of Cerium(IV) Oxide and melted to extract Cerium Oxide nanoparticles with different ratios of Ce^{3+}/Ce^{4+} . A previous TEM investigation confirmed the presence of the multivalent cerium oxide nanocrystals on the extracted nanoceria. This current study investigates the FTIR spectrum of the glass and extracted nanoceria using different extraction mechanisms. Nanoceria is acquired from the glassy substrate, and the results show a clear O-Ce-O along with Ce-O-Ce stretching vibration bonds in the extracted nanoceria in comparison to the nanoceria-containing

glass. EDX analysis has been conducted to confirm the presence of any residual compounds still left after washing.

Influence of Coulomb Scattering on 1D Laser-Generated Electron-Hole Plasmas Driven by a Strong DC Field

In person oral presentation – Room M 132

11:15am – 11:30am

Undergraduate Student(s): Ethan Winchester and Chris Foster

Graduate Student(s): Rachel Cooper

Research Mentor(s): Jeremy Gulley

One-dimensional quantum systems have a critical place in the future for understanding the dynamics of optoelectronic sensors containing semiconductor nanowires and nanowire arrays. It is commonly assumed that charged-particle collisions (referred to as Coulomb scattering) are not significant in predicting the behavior of laser-generated electron-hole plasmas in these nanowires. For low carrier energies we have confirmed this result. However, when a strong bias voltage is applied to the nanowire or an above-resonance high energy optical pulse, the models that account for Coulomb collisions diverge from the low energy predictions. We show the impact of these effects in simulations of 1D electron-hole plasmas in a GaAs nanowire using the fully fitted band-structure. We compare the results with and without Coulomb collisions and demonstrate the regimes where such corrections are not negligible. In this work we have included Coulomb collisions, but omitted many-body Coulomb dephasing of the quantum coherence between electron states. Because our results show regimes where the Coulomb collisions are not negligible, it is likely that dephasing will also be important in these regimes, should the nanowire be exposed to additional light.

College of the Arts

Dance

Deaf Inclusion and Accessibility in the Dance Field

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Samantha M. Doyle

Research Mentor(s): Caroline S. Clark

Over the past ten years, the dance field in the United States has shifted towards practicing diversity and inclusion. However, there are still underrepresented groups in dance, such as the Deaf community. There is a current lack of pedagogical content to help dance teachers and choreographers be inclusive to Deaf dancers. This research addresses the gap by discussing issues and access for Deaf and hard-of-hearing (HOH) dancers in the dance classroom and on stage. To do so, I present a literature review and

analysis of current scholarship with a goal of bringing awareness to the current lack of accessibility to dance classes for Deaf dancers and promoting dance instructors and choreographers to be more inclusive in their teaching styles. To begin, the disability and culture of deafness is discussed. Since the Deaf community does not see deafness as a disadvantage but rather as a cultural experience, it is important to consider their views on deafness and their culture's representation. Then, I focus on pedagogical efforts in the dance field and on the incorporation of American Sign Language (ASL) into dance choreography. When ASL and dance are viewed as two movement-based expressions, the two can be combined in creative ways. For the future, I would like to see an increase of accessibility in dance classrooms for Deaf dancers. This research covers strategies that allow dance teachers to plan classes and choreography with more inclusion and lays the foundation for future research.

Music

Improvised Poetry: A Collaborative Workshop

Virtual oral presentation – [Join now](#)

11:15am – 11:30am

Undergraduate Student(s): Yazmeen Mayes

Research Mentor(s): Laurence Sherr

In this project, the audience and I will create a collaborative poem. This process would start with a prompt or question that I will present to the participants. The prompt will serve as the topic for the song, and the audience would take seven minutes to write a response to the topic. Then, we will share our responses, and some (willing) audience members would offer one phrase or sentence from their own written response. Next, we would compile these phrases into a list and discuss common themes, analogies, and ideas. After, we will revise the poem as a group, and read the final piece. Thus, by the end of this workshop, the audience and I will have created a collaborative poem.

Theatre and Performance Studies

Adapting and Updating Modern Text for Contemporary Audiences

Not presenting.

Time Not Applicable

Undergraduate Student(s): Matthew Weeks

Research Mentor(s): Thomas Fish

Throughout theatre and literature, the term "modern" as a descriptor, is somewhat of a misnomer as it, by definition, refers to things of the present time. While this technically is accurate when considering the Modern Era of literature, colloquially, the word does not accurately describe what is being presented. When looking at theatre from the modern era, something important needs to be considered: the culture and society that these plays were written in are completely different than that of today. A play written

*in the late nineteenth century will have vastly different politics and societal norms from what we see today. For these plays to be relevant, those differences must be assessed and considered. This would be done to mark the areas where pieces or “Modern” literature may fall short culturally, as well as highlight what can be done to mold such works into something more relevant, and therefore more impactful. This project will do this by looking critically at a piece of modern theatre, *The Seagull* by Anton Chekhov, and the original context in which it was written. It will then go on to examine how that context differs from the context in which it would be performed today. Not only will this touch on various ways of interpreting the text, but it will also include contemporary adaptation of the script and how that can shift the way it is received. This opens up the discussion of which of these differences should be addressed when producing or adapting these plays, and what is the best way to go about bringing these stories to an audience.*

Authenticity and Humanity: Women in Ming Dynasty Theatre

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Sarah Rogers

Research Mentor(s): Thomas Fish

*Since the dawn of theatrical performances, women had very limited opportunities for participation and presence in productions, often being portrayed onstage by male actors in untruthful, borderline degrading drag, which fortunately was not the case for the Ming Dynasty. My research investigates the societal roles and customs that women in the Ming Dynasty were initially assigned to and the shift they experienced in these roles; this shift empowered women to have more agency in every aspect of their everyday lives, especially in participating in performances. Methodologically, I consider the feminist/gender lens of Karl Marx’s Critical Theory and the opera *The Peony Pavilion*, along with performance clips from this opera and an article from the actress who originated the role of protagonist Tu Lianiang. This project will interest gender/womens’ historians and theatre practitioners alike; it provides historians insight into how women in early Chinese history adapted to changes in cultural and societal standards, and for theatre practitioners, an angle to analyze the importance of truth, humanity, and earnestness in an actress’ craft.*

An Investigation of the Rhetorical and Representational Aspects of Bleed Green

In person oral presentation – Room M 132

1:00pm – 1:15pm

Undergraduate Student(s): Jacob Segura

Research Mentor(s): Charles Parrott

This essay serves as a retroactive examination of a personal narrative storytelling performance, describing my experience working for the supermarket Publix. This essay offers an interdisciplinary critique of my story using three concepts: framing, foregrounding and backgrounding, and

representation and agency. Storytellers need to critique their works to hone their craft, and this paper provides a model that will expand the body of knowledge of such analytical methods for future storytellers.

"The Oriental Princess": Intersectionality in Euripides's Medea

In person oral presentation – Room M 132

1:15pm – 1:30pm

Undergraduate Student(s): Riley Borst

Research Mentor(s): Thomas Fish

The paper examines the play Medea and how the topic of intersectionality is woven throughout the language and plot. Women and immigrants in Greece were treated as second-class citizens, and this paper examines how Euripides's Medea is an example of being a voice for oppressed people. Through this, it becomes clear that, when examined in the scope of a modern lens, Medea's character showcases the topics of feminism and xenophobia. My research inspects the language and plot of Medea to see how women were given a powerful voice in this play through a character who has been constantly labeled as a villain. Medea, I will explain, is a strong, self-reliant woman who fights for the justice she deserves in her life, in contrast to the unhinged stereotype that has always followed her character. She also fights for her spot in ancient Greece even though she is a foreigner in the land. I will be investigating the language and character in Medea along with historical presidents of the time to strengthen my argument through the lens of intersectionality. I will also be expanding upon the work of "Medea the Feminist" (Betine Van Zyl Smit) and "Rhetorical Feminism in Euripedes' 'Medea'" (Jeffrey Zorn) while also incorporating how Medea's race also plays a critical role in the way her character is treated. This project highlights the relevance of classical theatre in today's society and provides possible insight for directors who want to rework classical texts for modern audiences. It allows us to examine how relevant topics like feminism and xenophobia are depicted in classical literature.

**Southern Polytechnic College of Engineering
& Engineering Technology**

Electrical and Computer Engineering

Optimal Total Harmonic Distortion of Programmed Pulse Width Modulated 5- and 7-Level Multilevel Inverters

In person oral presentation – Room M 132

3:00pm – 3:15pm

Undergraduate Student(s): Austin Blake Wilson

Research Mentor(s): Bill Diong

As clean energy technologies such as solar panels, and fuel cells become more prevalent, the demand for DC-to-AC inverters increases. Using multilevel inverters offers several advantages compared to other inverter technologies, such as reduced system size, weight, and cost, as well as higher efficiency. Deployment of these inverters however faces the issue of harmonic distortion, preventing mass adoption. The purpose of this paper is to contribute to the body of knowledge on the Total Harmonic Distortion (THD) produced by both 5- and 7-level programmed Pulse Width Modulated (PWM) symmetric and asymmetric Cascaded H-Bridge (CHB) inverters. Analytical expressions for the inverter output waveform were obtained from previous research which used a double Fourier integral technique and optimization algorithms employed to find the THD-minimizing device switching angles. The experimental results were then compared to the analytical and simulated results. This research offers insight into the ideal ratios of asymmetry and the appropriate device switching angles needed to achieve minimum THD for 5- and 7-level programmed PWM inverters.

Engineering Technology

The KSU 3DPECO Rack System

Virtual oral presentation – [Join now](#)

1:00pm – 1:15pm

Undergraduate Student(s): Kalo Gomez

Research Mentor(s): Randy Emert

With the KSU 3D Print Center growing at its current pace into the different disciplines, a unique system was needed in order to create a functional ecosystem. The goal was to create a system that could be utilized to house 3D printers within the KSU 3D Printing Ecosystem. The rack system was created to quickly and easily create new 3D print labs or to expand existing ones while staying within a reasonable cost. At the same time the system needed to be easily and efficiently customized for a variety of different 3D Printer makes and models as well as mounting and power. To best accommodate a variety of printers the rack frame can be changed out for different lengths heights or widths. We decided on Husky brand shelving as our frame as they are heavy duty and accommodated our printer models reasonably well. Next, we needed shelves, while we had many options including the stock grating used by the Husky brand racks, we chose MDF board as it was easy to cut and could be used to make shelves for an entire rack. MDF also looked nice and clean and could also easily have holes cut into it to best manage the cables running to and from the printers. To power the printers, we used APC brand surge protectors. For our configuration we used APC surge protectors with 12 outlets and 2 USB outlets. Lastly, the system needed mounting components. These components were used both for mounting and cable management. All the mounting components used were designed for the rack system and its specific components such as for the power supply units. While there will probably be more changes made to this system, right now it is exactly where it needs to be.

Mechanical Engineering

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

Virtual oral presentation – [Join now](#)

12:30pm – 12:45pm

Undergraduate Student(s): Vlad Mandzyuk

Research Mentor(s): Adeel Khalid

This research determines the relationship between the High-Pressure Compressor (HPC) rotor blade design variables and compressor pressure ratio of a high bypass turbofan engine. Alterations in the HPC blades span, chord, taper, twist, number, and angle of incidence are performed and their effect on the engine's performance is observed. The objective is to determine key parameters that could maximize the performance of a gas turbine engine for a given mission. The metrics used to compare engine performance include thrust, thrust specific fuel consumption, and overall efficiency. Parametric cycle analysis (PCA), computational fluid dynamics (CFD), and wind-tunnel testing are performed to compare and validate findings. PCA is a physics-based method performed mathematically to serve as the benchmark for data obtained through the other methods. The CFD method replicated wind-tunnel testing within a computer setting. In this experiment, the first stage of the high-pressure compressor was designed and simulated. Upon the completion of these experiments, wind-tunnel testing will be conducted to confirm results. Data will be compared in the form of graphs relating the stage pressure ratio of the HPC to the corresponding blade design variable. The goal of this study is to optimize the design of the HPC using the discovered design variables related to the maximum pressure ratios to maximize the engine performance. This will result in lower operating costs, longer range, and lower emissions. When implemented, the engine optimized for the specific mission could save the aircraft manufacturer and operators the initial and operating expenses. Additionally, answers to the following questions will be determined. Do the use of CAD (Computer Aided Design) and CFD models provide a feasible solution for gas turbine engine optimization? Do the results obtained from CFD analyses show the same level of improvement in engine performance as obtained by physics-based models?

Using a Motion Compensating Tracking System to Study the Behavior of Fire Ants

Virtual oral presentation – [Join now](#)

12:15pm – 12:30pm

Undergraduate Student(s): Kevin Le and Todd Morgan

Research Mentor(s): Dal Hyung Kim

Insects are a common staple in the research industry due to their unique and diverse characteristics and behavior. In recent years, however, more and more studies have been using some sort of tethering device which reduces natural movement and behavior in some insects. More specifically, flying insects, such as fruit flies and silk moths, who instinctively take flight whenever they encounter a stimulus gradient (e.g., change in vibration, aroma, light, and temperature). Our research focuses on tracking red

imported fire ants (Solenopsis invicta) without tethering by using the transparent omnidirectional locomotion compensator (TOLC). The TOLC acts as an infinite space which allows the insect to navigate freely without restrictive movement. The device implements a model predictive control feedback to track and gather data from the ant's movement. Various data have been collected and processed through MATLAB code, such as position, velocity, probability density function, cumulative distribution function, gaiting speed, and error graphs. The data will then be compared to the ant's anatomical size to see if there are any correlation.

Heat Pipe-Cooled, Curved Fuel Plate, Fast Micro-Reactor for Use at Remote Sites

In person oral presentation – Room M 132

2:15pm – 2:30pm

Undergraduate Student(s): Kyle Maldonado

Research Mentor(s): Andrew Hummel

The experiment is focused on designing, modeling, and analyzing a microreactor capable of producing between 1 and 1.5 MWe for use in remote locations and military installations. The reactor will be under 2 meters in diameter and uses fuel plates filled with UO₂ fuel similar to the MIT Reactor (MITR) but has curved fuel plates arranged concentrically in 6 or 8 wedge sections instead of straight fuel plates in rhomboid-shaped fuel elements. This design also uses stainless steel heat pipes (potassium) to passively remove heat from the active core similar to the Los Alamos National Laboratory (LANL) Mega-Power concept, a heat pipe-cooled, 5 MWt fast reactor. MCNP is the software being used to model this reactor and analyze the effective multiplication factor. Using this data, the size of the fuel elements or reactor may need to be adjusted to reach the desired multiplication factor. Thermodynamic analyses will also be conducted to find the power produced by each individual fuel plate and the amount of heat carried away by each heat pipe. This data can be used to optimize the amount of heat pipes necessary in the core.

Design of Emergency Response UAS for University Campus Safety

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Jessica Burroughs

Research Mentor(s): Adeel Khalid

The objective of this study is to research, design, and manufacture an Unmanned Aerial System (UAS) to help make the Kennesaw State University Marietta Campus safer. The UAS will be operated by the campus safety and emergency response department. The UAS will autonomously patrol a predefined route across the Kennesaw State University Marietta Campus. While the UAS is patrolling live footage will be sent back to the ground station to see if anything is out of the ordinary. If there is an emergency the UAS will be flown manually to deviate off route to go loiter near the event and provide live footage while the police are on the way. The live footage from the UAS will also be used to decide if the Fire Department and Ambulances are needed. During this study, different Unmanned Aerial Systems will

be researched and reviewed for how a specialized UAS for the Kennesaw State University Police Department can be created. Different patrol routes will be created and analyzed to ensure that the maximum footage distance and angles are found. The scope of the project included detailed design of the vehicle, component selection, optimization and integration.

Parametric Study of an Asymmetrical Soft Millirobot in a Rotating in Magnetic Field

Virtual oral presentation – [Join now](#)

1:30pm – 1:45pm

Undergraduate Student(s): Graham Quasebarth and Jake Bagley

Research Mentor(s): Dal Hyung Kim

Untethered small scale robots have many applications in bioengineering fields, and recently we designed and characterized the types of motion of a millimeter scale, magnetoelastic robot within distinct frequency ranges of a controllable, non-uniform magnetic field in a 3-axis Helmholtz coil. The robot has constant width and height with length comprising of a magnetic polymer (head) and nonmagnetic polymer (tail) section, and its head section has been magnetized at an angle with the robot's longitudinal and vertical axes to create magnetic torque for locomotion in the forward direction while submerged in water. This type of motion exhibits high controllability and speed, which is at a maximum when the rotational frequency of the robot and the magnetic field are in sync. In an effort to optimize the soft robot's locomotion and define a relationship between these two frequencies, experiments are conducted to measure dependencies qualitatively and quantitatively on fabrication parameters, namely the aspect ratio of the head and tail section. These measurements are derived from image tracking data of the corkscrew locomotion of robots with varying aspect ratios, and they are captured from a position perpendicular to their planar trajectories over a range of rotating magnetic field frequencies. This study in conjunction with a similar one focused on the head section's magnetization angle, will contribute to further optimization of the soft millirobot's speed and controllability for modeling of the swimming behaviors of fish.

Robotics and Mechatronics Engineering

Biology to Biotechnology: Implementing Characteristics of Bat Navigation on Mobile Robots

In person oral presentation – Room M 132

2:30pm – 2:45pm

Undergraduate Student(s): Charles Koduru and Sunny Leveson-Jones

Research Mentor(s): Muhammad Hassan Tanveer

Robots are used for a variety of tasks that require a complex series of actions, such as understanding the environment, navigation, and communication, all of which require collaborative and autonomous capabilities. Existing systems accomplish this goal with cameras, radars, and laser scanners, which have two inherent limitations: i they only work in specific lighting/environment conditions, and ii) they

generate a massive amount of sensory data, which is often incompatible with platforms with limited onboard computing, memory, and power resources. To address power concerns, we propose the Bio Sonar System (BSS), a unified framework for environmental understanding and communication. The proposed design concept is low-cost, quick, and appropriate for real-time applications with changing lighting and environments. The proposed method is based on how bats navigate in a swarm using lightweight transducers such as a nose (or mouth) and two ears. In a complex environment like caves, such transducers are sufficient for achieving excellent inter and intra communication. As a result, the proposed BSS method mimics bats' ability to sense geometry of complex unstructured natural environments by utilizing distributed sensing and following adaptively nominated swarm leaders. To navigate and complete the task, BSS allows robots to detect the speed and distance of nearby objects, as well as their 3D shape, in order to effectively echo-locate the environment. 1) Data Acquisition is one of the project's specific goals. ii) Scene Recognition and Navigation We want to create a lightweight 3D Convolutional NeuralNetwork (3DCNN) for real-time detection and localization of nearby objects. Each robot with a pre-trained 3DCNN model would use cutting-edge navigation algorithms for collaborative sensing, route planning, and tracking in previously unseen real-world scenarios. iii) The ability to communicate. BSS sends out sound waves and uses echo signals to understand the environment. Allowing for effective mobile robot navigation in unmapped environments.

WellStar College of Health and Human Services

Exercise Science and Sport Management

Associations with Insulin Resistance and Skinfold Measures in Pregnant and Non-Pregnant Women

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Hannah Sandstrom, Maria Mora, and Camella Neal

Graduate Student(s): Mara Bryan

Research Mentor(s): Katherine Ingram, Juliana Meireles, and Sadaf Dabeer

Introduction: Studies have linked obesity in pregnant women with insulin resistance which is associated with body fat. A common, practical, and efficient method of measuring body fat is skinfold measurements. The association between insulin resistance and body fat measurements using skinfolds has been investigated but has neglected pregnant women populations. This study analyzes data between two groups, pregnant women and non-pregnant women. It is important to understand if body measurements, such as the skinfolds, can be used in earlier stages of pregnancy to identify insulin resistance because of the possible risk to fetal metabolic dysfunction. Therefore, the aim of the study is to understand the differences between skinfold measures and insulin resistance among pregnant and non-pregnant women. Method: Fasted glucose and insulin levels were used to assess insulin sensitivity using Homeostatic Model Assessment-Insulin Resistance (fasting plasma glucose (mmol/l) • fasting serum insulin (mU/l) ÷ 22.5) in pregnant (N=23) and non-pregnant (N=39) women. The pregnant

participants (mean age = 27 years) were measured at twenty weeks of pregnancy and had BMIs ranging from 19.70 to 52.10, were 74.07% White, 11.11% African American, 11.11% Hispanic, and 3.70% Other. The non-pregnant participants (mean age = 20.91 years) had BMIs ranging from 23.26 to 36.4, were 43.59% White, 46.15% Hispanic, 5.13% African American, and 5.13% other. Multiple skinfold thickness sites were measured with calipers to assess regional subcutaneous fat (tricep, chest, midaxillary line, subscapularis, abdomen, suprailiac, and thigh) in both populations. Pearson correlation coefficient was used to assess correlation between HOMA-IR and skinfold measurements. Results: The relationship between tricep, chest, and thigh measures and HOMA-IR were significant ($p < .01$). The subscapular, midaxillary, abdominal, and suprailiac measures were also significant ($p < .05$). The non-pregnant participants show no correlation between HOMA-IR and skinfold measures ($p > .05$). Conclusions: Among the pregnant participants, there is a strong correlation between higher insulin resistance levels according to HOMA-IR and higher skinfold measurements. The association between higher insulin resistance and skinfold measurements was present in pregnant participants, but not in non-pregnant participants. These results indicate that pregnant women with higher levels of subcutaneous fat measured by skinfolds is associated with an increase in insulin resistance. Pregnant women should be made aware of this and take preventative measures to combat the onset of insulin resistance with frequent light to moderate exercise and diet modifications.

The Relationship Between Self-Reported Exercise Levels During Pregnancy and Labor Pains

Virtual poster presentation – [Join now](#)

1:00pm – 1:15pm

Undergraduate Student(s): Maria Johnson and Jaiden Outten

Research Mentor(s): Katherine Ingram, Sadaf Dabeer, Julianna Meireles, and Janeen Amason

Background: Physical activity is important to maintain overall health and wellness even during pregnancy. There are numerous benefits to exercise during pregnancy that include reduced back pain and lower risk of preeclampsia and gestational diabetes. Recent studies have shown an association between aerobic exercise and reduction in the intensity of labor pains. Purpose: The purpose of this study is to determine the association among level of exercise level and the intensity of pain during active labor. Methods: Women up to 2 years postpartum were invited to complete an online survey about the frequency of exercise (none, occasionally, a few times a week, or most days of the week) and intensity (high, moderate, and light). To calculate exercise level, we used the formula $\text{exercise level} = [(\text{high} \times 3) + (\text{moderate} \times 2) + (\text{light} \times 1)] \times \text{Frequency}$. Participants also answered how intense their active labor pains were using a scale of 1-10, with 10 being the worst. The Kolmogorov-Smirnov test was used to evaluate data distribution and Spearman's test to verify the correlations. Results: A cohort of 160 women aged between 22 to 47 years (mean age $32 \pm .36$ years, BMI 29 ± 0.47) suggested no correlation between exercise intensity during pregnancy and pain intensity during active labor ($p > 0.05$). In addition, the mean exercise level was 20.17, the maximum being 69. The labor pain mean was 7.5, with the maximum being 10. For high exercise intensity, half of the population reported none. For moderate exercise intensity, the majority reported sometimes. For light exercise intensity, the majority claimed they

exercised 2-3 days of the week. Conclusion: There was no correlation between exercise levels during pregnancy and labor pains. However, ACOG recommends that women include exercise in a healthy pregnancy to ease discomfort. Therefore, further research is needed to determine the role of exercise in labor pains with previous studies showing a linkage between exercise and pain during labor.

Effect of Exercise in Preventing Gestational Diabetes Mellitus in Racially Diverse Overweight Pregnant Women

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Barrington Francis, Ami Eho, and Bre McDonald

Research Mentor(s): Katherine Ingram, Sadaf Dabeer, and Juliana Filguerias Meireles

Introduction: With the increase in unhealthy lifestyles in the Western world, obesity and other chronic diseases plague our current society. Gestational diabetes mellitus (GDM) remains a major complication affecting 7-10% of pregnancies. The fetus is affected by GDM which increases chances of having diabetes in their lifetime. Racial and ethnic minority populations especially American Indians and African Americans are at a higher risk of GDM. Some studies postulated that this might be due to the prevalence of obesity in these groups. Exercise has been shown to lower the risk for GDM in overweight pregnant women. Studies reviewed the necessity of exercise pre-pregnancy and during pregnancy, but the correct amount of exercise to see these effects in racially- diverse women remains to be determined.

Purpose: The aim of this study is to conduct a systematic review which evaluates the specific exercise volume required to prevent GDM in women of different races who are also overweight. Methods: PubMed, Cochrane Library, EMBASE, and the Kennesaw State University library system will be searched to identify systematic reviews and randomized trials published until 2021. Key terms to be utilized include: pregnancy, GDM, at-risk, obesity, race, and exercise/physical activity. Using these terms but omitting “obesity,” the number of sources available on PubMed narrowed to 21 sources. Of these 21 sources, based on the criteria deemed necessary for the review, different races represented, at-risk women with GDM, and the volume of exercise deemed necessary, only five of those 21 articles matched the necessary guidelines. When key terms overweight, pregnant women, exercise, GDM were entered along with the Boolean operators with terms AND, OR in PubMed, excluding the focus on diet, 78 results were obtained. With the filters of English for language and human for species checked, 10 were deemed fit. Including the five sources from the search focusing on race and the 10 sources found from an obesity focus, 15 total sources were collected. Conclusion: The findings from this study will provide more information about specific exercise volume that should be recommended as part of prenatal care to pregnant women based on their racial differences in order to decrease the prevalence of GDM in these groups.

The Association Between Age, BMI, and Gestational Weight Gain With HOMA-IR During Pregnancy

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Isabella Maxwell and Delia Manocchio

Research Mentor(s): Katherine Ingram, Sadaf Dabeer, Juliana Meireles, and Janeen Amason

Introduction: The Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) is used to determine insulin resistance in individuals. During pregnancy, several variables may be related to HOMA-IR, including age, gestational weight gain (GWG), and body mass index (BMI), which classifies an individual's weight as healthy or unhealthy. The objective of this research is to test the relationships of age, GWG at 20-weeks, and BMI at 20-weeks with log HOMA-IR. Methods: Twenty-six women (27.8±4.2 years; 74.1% white) completed this study between 2015 and 2016. HOMA-IR was measured using fasting plasma insulin and blood glucose (fasting insulin[microU/L] x fasting glucose [nmol/L]/22.5). The Pearson Correlation test was used to determine correlations between the variables. Results: Mean GWG_{20-weeks} was 5.3kg±5.1 (range -5.4 kg to 15.9 kg). BMI_{20-weeks} ranged from 19.7 kg/m² to 43.5 kg/m², with an average of 29.6444 kg/m², ±5.99733. There was a correlation between (r=0.614, p=0.001) HOMA-IR and BMI_{20-weeks}. There was no correlation between HOMA-IR and age (r=0.044, p=0.83), nor between HOMA-IR and GWG_{20-weeks} (r=0.173, p=0.39). Conclusion: Our study showed there was no correlation between age and HOMA-IR, nor between GWG_{20-weeks} and HOMA-IR; however, a correlation between BMI_{20-weeks} and HOMA-IR was found. These findings may allow practitioners to understand how HOMA-IR relates to female body fat and thus monitor this variable during pregnancy to avoid complications.

Agreement Between 2 Bioimpedance Devices for Estimating Body Composition in Pregnant Women

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Sebastian Russell

Research Mentor(s): Katherine Ingram, Sadaf Dabeer, and Juliana Meireles

INTRODUCTION: Body composition is an important metric in pregnant women for assessing risk of metabolic disorders such as gestational diabetes mellitus. The InBody (IB) 720 and InBody 230 (InBody, Seoul, South Korea) are multi-frequency bioelectrical impedance analysis (BIA) devices used to estimate body composition. The IB720 is a research-grade device while the IB230 is a portable device. Previous studies have assessed the agreement of BIA devices in general population adults but not in pregnant women. The purpose of this investigation was to evaluate the reliability of the IB230 and IB720 to measure total body water (TBW), total lean mass (TLM), and total fat mass (TFM) in pregnant women. METHODS: Thirty-two pregnant women (27.0±7.8 years; BMI 31.8±4.5 kg/m², 68.8% Caucasian) were evaluated using the IB720 and the IB230 at 19-21 weeks gestation. Total body water (TBW), total lean mass (TLM), and total fat mass (TFM) were estimated and compared using Pearson's correlation coefficients. RESULTS: Average TBW was 34.8±5.1kg from IB720 and 34.9±5.41kg from IB230. Average TLM was 47.7±7.0kg from IB720 and 45.6±11.4kg from IB230. Average TFM was 34.7±15.2kg from IB720 and 34.6±14.7kg from IB230. Measures from IB720 and IB230 were strongly correlated for

TBW, TLM, and TFM ($r = 0.994, 0.663, 0.998$, respectively, $p < 0.01$ for all (2-tailed)).

CONCLUSION: The IB720 and IB230 produced similar measurements for TBW, TLM, and TFM. The data suggest that the portable and more accessible IB230 was in agreement with the IB720 and can be used to estimate body composition in pregnant women.

Health Promotion and Physical Education

The Role of Body Mass Index and Sex on College Students' Perceived Stress Levels, Diet, and Eating Habits

Virtual oral presentation – [Join now](#)

2:15pm – 2:30pm

Undergraduate Student(s): Meikaela Lemley and Jace Patterson

Research Mentor(s): Afekwo Ukuku and Kevin Gittner

Background/Purpose of Study: College students are faced with many issues throughout their academic career, whether it be from high levels of perceived stress or poor eating and dietary habits. From previous literature, sex and Body Mass Index (BMI) have been shown to play a significant role for a student's level of perceived stress as well diet and eating habits. However, the two factors, sex and BMI, have not been analyzed together in a single study. There is a dearth in the literature investigating the role that BMI and sex play into the intersection of collegiate eating habits, diet and stress. The purpose of this study is to provide insight into which factor, BMI or sex, may play a greater role in a college student's eating habits, diet and stress level. *Methods:* The design of our study is an anonymous quantitative questionnaire survey which will be administered for the collection of data. The survey will be in digital format and will include questions adapted from the Perceived Stress Scale, Three Factor Eating Questionnaire, and the Healthy Eating Assessment. Participants will include traditional college age students, 18-23 years old, at the Kennesaw State University in Kennesaw, GA. *Impact:* Findings from this study will highlight the importance of stress reduction and nutrition in college students and will also allow for the creation of sustainable and effective interventions in a population that is just learning how to live independently.

Does Ethnicity and Student Year Affect Perceived Stress of Academic Courses and Coping Mechanisms Used?

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Sara Casagarnde and Myri Wynn

Research Mentor(s): Afekwo Ukuku and Kevin Gittner

Background: Stress caused by academic courses places a major burden on college students. Long term, or chronic stress, can lead to severe health complications later in life. The objective of the study looks at the intersection of ethnicity and academic year in relations to coping strategies and perceived academic stress in college students' lives. The aim is to use this study to provide knowledge on how coping

mechanisms differ throughout ethnicities by utilizing convenience samples and a cross sectional study design for analysis. Methods: Twenty to fifty undergraduate college students will be surveyed around the Kennesaw State University campus at varying days and times. These students will take a survey on Qualtrics that is 24 questions long. This survey is a version of the Perceived Stress Scale and Brief COPE Scale. The Perceived Stress Scale will examine the thoughts and feelings of academic stress among students, and the Brief COPE scale will examine if students use emotion, problem, or avoidant focus coping for academic stress. These scales will investigate if different ethnicities have more perceived academic stress and how they cope. Results: Researchers hypothesize that ethnicity and student year do affect perceived stress of academic courses and the types of coping mechanisms chosen. It is expected that marginalized ethnicities further in their studies may experience additional stress compared to non-minority ethnicities. Conclusions: This study hopes to close a gap by focusing on perceived academic stress and coping strategies in different ethnicities.

Nursing

Barriers to Medication Adherence to Adult HIV-Positive Minorities

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Jerry Zheng, Diego Zarate, and Bea Flores

Research Mentor(s): Mary Dioise Ramos

Background: Antiretroviral therapy (ART) is used for individuals living with human immunodeficiency virus (HIV), which is used to prevent the progression to acquired immunodeficiency syndrome (AIDS). However, despite ART being highly effective for the treatment of HIV, poor medication adherence occurs in today's society, particularly in the minority population in the United States. Purpose: This study synthesized the available evidence about factors and barriers that disproportionately affect medication adherence among the minority population living with HIV. Methods: The Johns Hopkins Evidence-Based Practice Model and Guidelines were used in the literature review, critical analysis, leveling of evidence, and quality rating. The PRISMA flow diagram was used to map out the number of records for inclusion and exclusion. Databases such as CINAHL, PubMed, and ProQuest were used to provide evidence for the research. "Multilevel Barriers for HIV Medication," "HIV positive minority or HIV positive or minority," "barriers or factors or attributes," "medications or Antiretroviral therapy or drugs," and "adherence or consistency" were search strategies used. These studies focused on minority participants aging 18 years and up that are diagnosed with HIV. Measures used to identify barriers included socio-ecological model (SEM), constant comparative method, multilevel model building, bivariate correlation table, HIV care continuum (public health model), audio-computer administered self-interviews (ACASI), and clinical medical records. Results: The initial search yielded 47 articles. Following the removal of duplicates and screening, seven articles were included for evidence appraisal. The identified barriers in poor medication adherence include financial instability, social stigma, educational deficits, legal status, transitional care, and factors related to the LGBTQ+ community.

Conclusion: The barriers in HIV medication adherence in minorities constitute a preventable problem. Awareness of the impact of barriers in HIV medication adherence may help healthcare providers and policymakers to plan and implement proper care management among this minority population group.

Nurse Manager Communication Associated with Staff Nurse Satisfaction or Retention

In person oral presentation – Room J 381

1:00pm – 1:15pm

Graduate Student(s): Svetlana Periut

Research Mentor(s): Mary Dioise Ramos

Background: Nursing communication is a significant part of a nurse's job, especially when communicating with their patients, patients' families, and the healthcare team. Communication is the center of attention of many studies, and the way nurse leaders relate messages can influence an organization's outcomes, including nurse satisfaction and retention. This integrative study aims to analyze communication styles, behaviors, and instruments used by hospital unit nurse managers to increase staff nurse satisfaction and retention. Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analysis were used in the literature search and review. The Johns Hopkins Evidence-Based Practice Model and Guidelines were used with the critical analysis and leveling of evidence. Results: Research reveals evidence that leaders exhibiting better communication competencies increase nursing staff satisfaction and retention. The most prominent theme is that staff nurses wish for more open, prompt, and transparent communication with leadership, and these lead to higher satisfaction and retention among staff members. Conclusion: The way nurse managers communicate with staff can lead to better company outcomes, including nursing satisfaction and retention. Using existing communication theories, methods, and tools can improve nurse leader proficiency in relating information to staff and increase nurse satisfaction and retention.

Distraction as a Tactic for Pain Management During Venipuncture Procedures Among Pediatric Patients

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Alexis Taylor, Savannah Lynch, Dwomo Dwumfour, and Grace Nyaga

Research Mentor(s): Mary Dioise Ramos

Background: Various research has found that venipuncture can cause significant pain and discomfort for pediatric patients. This can also cause an influx in anxiety for both the patients and their families during hospitalization. While significant research has been done on interventions to lessen this pain and anxiety, there is little known about the use of routine and effective distraction techniques to decrease venipuncture pain for hospitalized pediatric patients. Aim: The purpose of this study is to examine if distraction techniques used during pediatric venipuncture results in lower pain ratings compared to when distraction is not utilized. Methods: The Preferred Reporting Items for Systematic Reviews and

Meta-Analyses (PRISMA) guided the selection of literature. A comprehensive review was conducted analyzing and appraising articles from Medline, CINAHL, and PubMed. Pain levels were analyzed using parental and patient reports and the Wong-Baker FACES scale. Anxiety, fear, and stress levels were also assessed. Results: Fifteen articles met the inclusion criteria and were analyzed for this study. The results of the study indicated that distraction helps lessen venipuncture pain in hospitalized children. While pain is still experienced, those undergoing distraction techniques reported less pain than their counterparts. Conclusion: The information in this study can be used to guide protocols for pain management among children in the acute care setting.

Women Experiencing Postpartum Depression

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Summer Andrews, Ashlynn Collum, Carmen Panter, Kaelyn Smith, and Natalie Slepisky

Research Mentor(s): Mary Dioise Ramos

Postpartum depression (PPD) is an ongoing issue when it comes to mothers after birth. PPD has been shown to affect up to 15% of mothers and is often skipped over when it comes to medical diagnosis and treatment. When postpartum depression becomes severe, it turns into psychosis, and this is considered a psychiatric emergency. The overall purpose of this project was to address the question: How postpartum women with depression receiving psychotherapy are compared to those postpartum women with depression without psychotherapy affect outcomes within 10 months of postpartum. The John Hopkins Evidence-Based Practice Model was used to review and analyze research studies. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guided the selection of literature. There are 21 articles that met the inclusion criteria. Postpartum women who received psychotherapy for postpartum depression showed positive outcomes such as healthy relationships with their children, while women who did not receive psychotherapy for postpartum depression showed a neutral or negative outcome in comparison to the women who received psychotherapy. Psychotherapy is an effective intervention for postpartum women with depression. Nurses have key responsibilities in educating women and their families about how psychotherapy can help reduce postpartum depression and how it can impact positive outcomes in their lives.

I Need Closure: Is Hyperbaric Oxygen Therapy Better Than Skin Substitute Therapy for Chronic Wounds?

[Recorded video upload – poster](#)

Time Not Applicable

Undergraduate Student(s): Priscilla Amofah, Akhenaten H. Amun, Tyler Brown, and Jasmine Charles

Research Mentor(s): Modupe Adewuyi

Individuals with diabetes mellitus deal with chronic wounds that are associated with poor health outcomes and frequently result in immobility, infections, and amputations. For these patients, there is a significant amount of literature on the use of oxygen therapy and synthetic skin substitute therapy in promoting chronic wound healing. However, there is limited published evidence comparing the effectiveness of the two therapies. Our goal is to summarize existing evidence of how hyperbaric oxygen therapy and substitute skin therapy affect wound healing in 9 months. We use the PRISMA model to guide our review of literature found in the Nursing & Allied Health Database using hyperbaric oxygen therapy, skin substitute therapy, chronic wounds, and clinical studies to retrieve relevant studies. We narrowed our review of literature to 22 studies based on criteria that required no affiliations between therapies, manufacturers, or brands. We also reduced inclusion of literature that rated high with selection, performance, and reporting bias. With scholarship from different countries around the world dealing with patient populations with chronic wounds, our review yielded mixed results. Few studies reported hyperbaric oxygen therapy as a primary therapy for treating chronic wounds while others indicated no significant differences between the two. We recommend that more research and development on hyperbaric oxygen therapy and skin substitute therapy is necessary to determine the best options and clinical outcomes for a growing population of patients needing our best in medicine and treatment.

Prolonged Hospitalization Effects on Psychosocial Development in Chronic Illness Pediatric Patients

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Zoe Quarles, Sophie Kinrade, Courtney Cumberland, and Megan Pringle

Research Mentor(s): Mary Dioise Ramos

Background/Objective: Frequent and extensive hospitalizations have a negative impact on the psychosocial development of children in the most formative years of their lives. This problem is most evident in children who have chronic disease or health conditions that require multiple hospital stays and interventions. This topic can be considered broad because of the extensive variety of chronic conditions and how that determines a child's length of stay. This study aims to identify whether patient-to-patient interaction impacts the psychosocial development in children who experience these extended and repetitive hospitalizations. Methods: Research was guided by the John Hopkins Evidence-Based Practice Model. Google Scholar, EBSCOHost, and PubMed were the databases used to search for key terms which included "prolonged hospitalization", "chronic illnesses", "psychosocial development", "pediatric", "school-aged", and "chronic". Only relevant evidence data from the last five years are analyzed to ensure the validity of the study and uncover the best evidence-based practice to implement. Results: A total of ten articles were appraised for the study. The following themes were identified: prolonged hospitalizations led to social developmental delays, there is an increased risk of delay in developmental milestones, and peer group interventions are recommended for better outcomes. Depending on the age, severity of illness, and peer interactions, children's development is affected.

Conclusion: Prolonged hospitalizations affect children's ability to reach developmental milestones. There are many different factors that play a role in reaching development milestones, and healthcare providers need to consider these factors in developing evidence-based interventions appropriate for this group.

The Impact of a 12-Hour Shift Compared to an 8-Hour Shift on Nurse Health and Safety

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Matthew Kramer, Andrea Howell, Kayla Kloes, Emmy Lam, and Brittney Levy

Research Mentor(s): Modupe Adewuyi

Background: An international healthcare concern is extensive shift length among registered nurses and the negative factors associated with nurse burnout. Cognitive impairment, medical errors, sleep deprivation, job dissatisfaction, and overall declined health and safety of nurses have been associated to long shift work hours among registered nurses globally. However, there is limited published evidence about the difference between 8-hour and 12-hour shift work. Objective: This systematic review summarized evidence on the impact that 12-hour shifts compared to 8-hour shifts has on the health and safety of registered nurses. Methods: PubMed, SCOPUS, EBSCOHost, NCBI, Google Scholar, and APHA's Medical Care databases were searched, covering the period from 2010-2021. Studies were included if their focus concentrated on nurses working 12-hour shifts in comparison to 8-hour shifts. All were of observational design. Results: Upon analysis of 12 peer-reviewed studies, in which data was collected on roughly 36,709 nurses in 8 countries, the findings indicate that shift length is in fact a contributing factor in nurse health and safety internationally. Adverse outcomes that frequently occur with extensive shift length are exhaustion, fatigue, burnout, sleep deprivation/inefficiency, job dissatisfaction, cognitive impairment, and medical errors. These outcomes play a role in diminishing emotional, physical, and mental health and safety of registered nurses. Conclusions: Longer shift lengths for registered nurses is associated with greater health and safety decline for nurses. Policy interventions are needed to resolve the shift hours required of registered nurses.

Parental Mental Health After Child Hospitalization

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Catherine "Samantha" Sowers, Cierra Pfaff, Micaela Ego-Aguirre, and Tyler Robinson

Research Mentor(s): Mary Dioise Ramos

Mental health is an epidemic that is prevalent in all stages of life, but parents have been found to be especially susceptible to thoughts of anxiety and depression related to feelings of guilt or inadequate parenting. Parents with children in acute care and intensive care settings reported new symptoms of anxiety, depression, and difficulty sleeping at night that they did not have prior to their child's

hospitalization. Research finds different mental health stressors during a child's hospitalization, and their effect on the parents likelihood of developing mental illness. This team aimed to answer the question, in parents with children who are hospitalized, how does their mental health prior to hospitalization compare to their mental health after hospitalization; what influences their likelihood of developing a mental health condition? The analysis found that sleep deprivation and parental guilt were two of the predominating factors in the development of a mental illness. It was also found that the higher the acuity of the admission, the higher the number of post traumatic stress disorder and acute stress disorder cases were reported. This analysis identifies causes of mental health strain on the caregivers and what measures can be taken by healthcare staff and the caregivers themselves to prevent and treat the increased risk of mental illness.

Understanding the Relationship Between Kangaroo Care and Neurodevelopment in Infants with Congenital Heart Disease: A Systematic Review

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Natalie Geralde, Alexis Antoci, Anne Aca, and Kamrin Burdell

Research Mentor(s): Jenna Shackelford

Background: Infants with congenital heart disease (CHD) are predisposed to significant neurodevelopmental delays related to disrupted parent-infant bonding, stress caused by invasive cardiac interventions, and overstimulating environments, such as the cardiac intensive care unit. Early promotion of neurodevelopment in infants with CHD is essential to support their overall health and quality of life, and to diminish the extent of neurocognitive delays. However, there is limited research examining the relationship between neurodevelopment in infants with CHD and the benefits of kangaroo care. Objective: The purpose of the systematic review was to evaluate the effectiveness of kangaroo care and touch on optimal neurodevelopment outcomes for infants with CHD. Methods: A systematic literature review was conducted using the databases Ovid, MEDLINE, and PubMed to identify eligible peer-reviewed, qualitative and quantitative research studies. Studies were systematically retrieved utilizing a search strategy with the following key words: "congenital heart defects or cardiac defects or heart defects or heart diseases," "kangaroo care or skin-to-skin," and "neurocognitive development or development or neurodevelopment or cognitive development or brain development or neurodevelopmental or psychological stress." Using specific inclusion and exclusion criteria for studies based on study type, relevance, population, and intervention, ten full-text articles were selected from the results. Results: Following a rigorous analysis and appraisal of the 10 articles, seven articles were included in the final review. The systematic review demonstrated that kangaroo care and touch interventions promoted increased salivary cortisol levels and comfort, decreased pain scores, and stable physiologic responses. All these factors influenced improved neurodevelopment long-term outcomes. In addition, research indicated that kangaroo care is a safe intervention among infants with CHD. Conclusion: Research demonstrated that kangaroo care is a safe intervention to implement with infants with CHD and may contribute to improved long-term neurodevelopment outcomes.

Evidence-Based Practice: Nurse-to-Patient Ratios and Length of Stay in the Emergency Department
[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Gina Hicks, Christine Landers, Rachel Abukhdeir, Quanta Bailey, and Alem Assefa

Research Mentor(s): Modupe Adewuyi

Background: The emergency department plays an essential role in delivering quality patient care. Factors that have contributed to fewer ED registered nurses are aging out of the field, lack of educators to teach nursing students which leads to fewer graduates entering the field, and burnout and exhausting of current registered nurses. Purpose: The objective of our study was to determine the impact of the ratio of registered nurses to patients on length of stay in the emergency department. Methods: We performed a systematic review identifying varying staffing levels and how they play a role in patient care. The PRISMA 2020 statement was used to develop and organize the protocol for our research. Only research presented on registered nurses (RNs) in the emergency department was considered. Results: While the extent of length of stay varied, all studies were congruent in that patient's length of stay was significantly longer in emergency departments who had fewer registered nurses on staff. Likewise, emergency departments with mandated nurse-to-patient ratios consistently recorded shorter duration of care as well as better patient outcomes and satisfaction. Conclusion: It is essential to have an adequate number of registered nurses in the ED to ensure the safety of patients and decrease their length of stay. Better staffing leads to reduced errors, better patient care, and efficiency. It also improves registered nurse retention rates and quality of life, and prevents job burnout.

Nursing Handoff Communication and its Impact in Quality Patient Care

In person oral presentation – Room J 381

1:15pm – 1:30pm

Undergraduate Student(s): Samantha Moser

Research Mentor(s): Mary Dioise Ramos

Patient handoff communication can be a lengthy process and sometimes results in inadequate information. Inadequate information can create confusion that can lead to problems with patient safety and patient care. Many of the nurses use different tools to conduct reports in a nursing unit, which sometimes leads to crucial information being overlooked, and additional time spent is added to the report. When patient handoff lacks the essential information needed for patient care, it can lead to delayed care. Ensuring the nurses have proper patient handoff tools will help them feel more prepared to take care of the patients. This project explores the impact of structured and formal reports among nurses on a cardiac floor during handoff communication in improving quality patient care and staff nurse efficiency. There are many evidence and studies that have been done regarding patient handoff tools. Research has been done to look at ways it can be improved and why nurses may lack in this area.

Different places have tried new and improved techniques to help with this problem, but they have not always been successful. Future research will need to focus on evaluating the impact of structured report sheet that nurses can utilize which includes all the critical aspects needed to care for the patient in the unit, which will help guide nurses in their clinical practice effectively.

Impact of Registered Nurse Burnout on Patient Satisfaction

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Addie McTyre, Emily Herring, Caitlin Kelley, and Michala Le

Research Mentor(s): Modupe Adewuyi

BACKGROUND: The Covid-19 pandemic has drawn more attention to burnout, a self-reported job-related syndrome experienced by registered nurses. Despite studies showing that poor self-health and job satisfaction are associated with registered nurses' burnout, little synthesized evidence is known about the impact on patient's safety and satisfaction, especially during the Covid-19 pandemic. OBJECTIVE: To determine the impact of registered nurse burnout on patient safety and satisfaction. METHODS: Through the guidance of our PRISMA 2020 statement, a systematic review was performed. The databases; Pubmed, ScienceDirect, Cochrane Library, Pubmed Central, and MEDLINE were searched using specific keywords to find relevant studies. Fifteen of the articles retrieved met the specified criteria required to be included in the systematic review. The criteria included articles that: are less than 10 years old, discussed nursing burnout, discussed patient safety in relation to nursing burnout, only included bedside nurses, only scholarly peer reviewed articles, and only studies with quantitative study methods. RESULTS: Some of the studies revealed an increased burnout among registered nurses resulting from the Covid-19 pandemic. The reviewed studies showed burnout among registered nurses is positively correlated with poor patient satisfaction. Additionally, some of the studies show patient safety is negatively impacted when nurses are experiencing burnout. CONCLUSION: The findings of the current systematic literature review suggest that patient safety and satisfaction are negatively impacted by the experience of burnout among registered nurses. Thus, there is an urgent need to have interventions to prevent and mitigate burnout among registered nurses.

Reducing Rates of Burnout in Newly Licensed Nurses Through Resiliency Programs

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Katherine Beckner, Connor Echols, Mark Pennington, and Katelyn McLaughlin

Research Mentor(s): Mary Dioise Ramos

Background: New graduate nurses face many struggles transitioning from student nurse to registered nurse, including nurse bullying, lack of confidence, and fear of making mistakes. With the added stress of the COVID-19 pandemic, newly licensed nurses (NLNs) are facing greater anxiety than usual.

Without proper coping mechanisms, burnout can occur quickly, leading to decreased job satisfaction, increased clinical errors, and increased resignations. The purpose of this project is to understand how resiliency programs for NLNs impact the transition from school to practice, specifically if burnout rates among this group are reduced. Method: A comprehensive review was conducted to analyze and appraise articles from multiple databases using the John Hopkins Evidence-Based Practice Model. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guided the selection of literature. Results: High levels of resiliency among NLNs are correlated with increased job satisfaction and intention to stay in the nursing profession. Multiple factors have been found to contribute to high levels of resiliency among NLNs, notably mentorship opportunities, adequate staffing, and promotion of work-life balance. Many of the studies showed that the NLNs who were exposed to resiliency programs experienced a longer window before reaching a burnout state or did not experience burnout at all, as compared to the NLNs who did not engage in resiliency programs. Conclusion: To reduce the onset of burnout in the NLNs and increase job satisfaction, employers would greatly benefit from implementing resiliency programs for this population of nurses.

Job Satisfaction Amongst Emergency Care Nurses

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Hannah Hastings, Jisoo Kim, Kiara Harvey, Shayne Douglass, and James Beam

Research Mentor(s): Modupe Adewuyi

Background: Registered nurses in the emergency department (ED) are subjected to negative patient interactions and sometimes active violence, which may lead to decreased job satisfaction and increased nursing turnover. Purpose: To synthesize and summarize published evidence on the relationship between workplace violence, job satisfaction and turnover among registered nurses working in the ED. Methods: We used the PRISMA checklist to guide our search of electronic databases for studies published between 2011 and 2021. Keywords included workplace violence, negative patient interactions, turnover and job satisfaction. We reviewed each selected study for evidence and quality levels independently and reached consensus on the appropriateness for inclusion of each study in this review. Results: Increased frequency and severity of patient-driven workplace violence negatively impacts job satisfaction and is a main driver of turnover. Conversely, compassion for patients as well as collaboration and camaraderie amongst staff in the ED appear to be positive mediators of job satisfaction. Conclusion: It is important for organizations operating EDs to address negative interactions and maximize positive interactions to facilitate optimal job satisfaction and performance among registered nurses in the ED.

The Effect of Covid Visitation Policies at Hospitals On Patient Satisfaction

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Justin Kabo, Madeleine Carden, Denise Thomas, and Lyla Garrison
Research Mentor(s): Mary Dioise Ramos

Background/Objective: COVID-19 has brought new challenges involving patient care and satisfaction. Visitor restrictions were implemented during the pandemic and continue to be a source of tension between hospital policy, patients, and family members. While there is currently limited research due to the recent onset of the pandemic, there is a growing desire to learn the impact of visitor restrictions. This study aims to explore whether patient satisfaction will improve during hospitalization if patients are allowed one family member during their hospitalization. Methods: The John Hopkins Evidence-Based Practice Model and Guidelines were used in the review and analysis of research studies. Eight articles were included for the review and the eligibility is based upon evidences of hospitalization of adults aged 18 or older during the covid-19 pandemic (March 2020-current). Results: Several common themes emerged related to visitor restrictions including increased anxiety, depression, complicated grief, and psychological distress. Limitations to the study is the lack of prior research due to the recent outbreak of the Covid-19 pandemic. Conclusion: After analyzing the evidence, it is evident that visitor restrictions can have a negative impact on both the patient and their family members. Hospitals and other healthcare facilities should consider the impact of family involvement in the care of patients during hospitalization.

Analysis of Unplanned Perioperative Hypothermia Effects on Post Operative Delirium through the Use of Biomarkers

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Justin Machado, Benjamin Ryle, Nicolle Sorto-Reyna, and Taniyah Wright

Research Mentor(s): Doreen Wagner, Sharon Pearcey, and Susan M.E. Smith

Unplanned perioperative hypothermia (UPH) is the unintentional drop in the body's temperature (below 36°C) during surgery (> 50 minutes). One retrospective study shows a relationship between post operative delirium (POD) and UPH. Critically ill younger patients who experienced UPH had a higher incidence of POD than critically ill older patients which warranted clinical investigation. The goal of our study is to investigate the relationship amongst various biomarkers, UPH, and POD in a clinical sample of critically ill non-cardiac adult patients with and without POD to determine the influence of UPH on POD development. Biomarker's indicative of inflammatory and oxidative stress will be explored. The inflammatory biomarkers being studied are IL6, S100B, and CRP. The oxidative stress biomarkers include protein carbonyl and HNE protein adduct. Our research is divided into two distinct phases: clinical assessment and laboratory analysis. The clinical portion consists of 100 surgical patients who will have temperature and POD clinical data recorded throughout and after surgery. These patients will have blood drawn and a delirium assessment administered three days postoperatively. In the lab, we will prepare serum from whole blood samples, that will be analyzed for the presence of biomarkers using enzyme-linked immunoassay (ELISA) approaches. These assays use sandwich, indirect, and competitive

ELISAs kits. Based on the standard curve regression line, the concentration of the unknown patient samples will be calculated. Here we present the preliminary findings based on the expected normal ranges for each biomarker in preparation for patient samples. Patient samples may be diluted for analysis.

Social Work & Human Services

Women, Connection, and Recovery: A Case Study

In person poster – Gymnasium

1:00pm – 2:00pm

Undergraduate Student(s): Sarah Mahler

Research Mentor(s): Jennifer Wade-Berg

Background: Women who suffer from substance use disorders have consistently been an underserved population. Addiction through history has been seen as a men's issue because women with addiction seek treatment at lower rates. Some of the reasons for this are stigma, lower income, being a primary caretaker for children, and cooccurring disorders such as post-traumatic stress disorder (PTSD). Women also have special needs in treatment. One need that was often left out of research was connection. How do women's connections with other women in sobriety affect the quality of their recovery? The purpose of this project will be to examine the growth of different women in correlation with their connection to other women. Methods: Data will be collected through secondary data collected by Rivermend Health. The data will consist of preciously collected mental health scores to compare scores from the beginning of treatment and the end of treatment. These results will be compared between 2 focus groups women (consisting of 3 participants each) who are living in their own home and women who are staying in recovery residences through treatment. Results will include the differences between these scores and analyze the factors of connection that play a role. It is expected that women who built strong connections with other women in recovery will have lower rates in anxiety and depression for a better chance of long-term recovery. One of the limitations of the study is that the final test scores are collected on the day of discharge which could result in clients answering questions in a dishonest way to be cleared to leave. This study will serve to highlight the importance of women's connections in treatment. Recommendations will include ways to connect women in recovery such as women's groups in treatment and creating guides for local women's 12 step meetings.

Reunification in the Foster Care System

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Macy White

Research Mentor(s): Jennifer Wade-Berg

There is a devastating and profound crisis in the United States foster care system. Guaranteeing a home is deemed safe after children are removed from the home for abuse or neglect is near impossible. Yet, accomplishing rapid permanency after a child is removed from their home is a priority for the child welfare system. But understanding the role of time to reunification in the risk of reentry is difficult. In the present literature review, reunification in the child welfare system is examined through risk factors and determinants in recent research. The research includes findings of foster care and prison, foster care and substance abuse and mental health, and what happens when reunification is not possible. In all states, reunification or some form of permanency is the main goal for children in foster care. The U.S. Department of Health and Human Services reported nearly 700,000 children were served by the U.S. foster care system in 2017, almost all of whom have a case goal of permanency through reunification through adoption, or guardianship. Permanency is considered a critical aspect for children in social services and the welfare system. Through this literature review, the complications of the child welfare system is studied. The results indicate a significant need for greater support and services for all children who enter and exit the U.S. welfare system. The findings suggest reunification in a timely manner is the most important aspect of the child welfare system, reentry after reunification is common, and fostered youth looking for families is a complicated journey that may need to be renewed. In addition, youth aging out of the foster care system have significant complications when transitioning to adulthood in our society. All things considered, these young adults need more support through government assistance or other programs.

Parental Leave Policy and its Impacts on Educators in Public Schools

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Tahy Addison

Research Mentor(s): Jennifer Wade-Berg

Public Law 103-3 cited as the Family and Medical leave Act of 1993, was enacted to grant family and temporary medical leave under certain circumstances. The Family Medical Leave Act (FMLA) was created for Americans who feel that their career takes valuable time away from their children and loved ones. FMLA allows eligible employees up to 12-weeks of unpaid leave for medical recovery, childbirth, child adoption, foster placement, and military. In 2021, Georgia's new parental leave policy entitles employees three weeks of paid leave that can be taken concurrently with FMLA. This policy analysis reviews the Georgia policy and its impact on public school teachers. Additionally, the analysis gives detailed insight into why Paid Parental Leave is perceived as beneficial or harmful for these educators and their families. Data were collected through the process of researching existing literature and interviews. Interviews will be conducted with Human Resource personnel within Cobb County. The perceptions of impact in the areas of social, emotional, and financial are reviewed.

Marketing and Outreach Strategies for Nonprofits and the Phoenix-Georgia

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Charlie Spradley

Research Mentor(s): Jennifer Wade-Berg

This project explores developing a marketing plan for nonprofits. Incorporating a marketing plan will help an organization move towards its mission. Without a marketing plan, potential benefactors may never know about the impactful work that the organization is doing. There are many different elements that make up a marketing plan. Volunteer engagement is a significant part of service delivery for organizations that require volunteers to run programming. Social media is becoming an increasingly vital aspect of people's lives and can be valuable for nonprofit organizations. Accountability to donors and the increasing requirement for a report of outcomes is driving nonprofit work today. People want to know that their money is making a difference. The organization that I will be making a marketing plan for is called The Phoenix Multisport. They are a national nonprofit whose mission is to create a sober active community. They have recently started a chapter in Georgia where I am an intern. Creating a template for marketing is what I have been assigned to complete. Engaging a new market can be challenging, which is why a strategic plan is necessary. Implementing a marketing plan for their new chapter will have a significant impact on the organization's impact in Georgia.

Transforming Course Work for Community Use and Publication

[Recorded video upload – oral presentation](#)

Time Not Applicable

Undergraduate Student(s): Lee McClellan-Karp

Research Mentor(s): Darlene Xiomara Rodriguez

Directed study courses allow students to develop invaluable research skills and experience while under the direction of a faculty member. As an Integrative Studies major participating in a directed study course at Kennesaw State University (KSU), I have had the opportunity to reflect, understand, and apply interdisciplinary practices for research and writing while preparing and revising program development manuscripts. The manuscripts were part of a previous Human Services Program Evaluation course at KSU, where students, including myself, provided research and program ideas for the Cobb and Douglas Public Health (CDPH) community health assessment. Using autoethnography, a reflective practice in qualitative research, the manuscript transformation process has helped me develop a deeper understanding of the research and the challenges of different populations in Cobb and Douglas counties. This study discusses the process of transforming course work for community use and publication and the changes that have occurred through self-reflective writings as a researcher.

Early Intervention Outdoor Sensory Program Using Applied Behavioral Analysis for Children With Autism

In person poster – Gymnasium

11:45am – 12:45pm

Undergraduate Student(s): Josephine Nelson
Research Mentor(s): Jennifer Wade-Berg

Studies have indicated the effectiveness of applied behavior analysis in building a wide range of essential skills and reducing behavioral problems in children with autism spectrum disorder, enabling them to live independently across multiple environments and enhancing opportunities for self-learning (Al-Khateeb, 2021). This project implements a 3-dimensional outdoor early intervention learning program using nature-themed sensory bins at the North Georgia Autism Center. The center's mission is to bring North Georgia the best in every Autism community we are privileged to serve. At the center, the objective is to increase beneficial behavioral skills and increase attentive skills. The literature suggests and reflects that children with autism spectrum disorder (ASD) often become entranced in one topic and revert all their attention to that, rather than their surroundings. They also are hypersensitive to certain stimuli, including noise, colors, people, etc., that are a part of everyday life (Barakat, 2019). Although The North Georgia Autism Center, and other researched Autism Centers, implement early childhood intervention for many children with ASD in group settings (Eapen et al., 2013), there are not a lot of implementations of outdoor learning and naturalistic play. Another goal of the outdoor intervention is to implement 3D natural learning objects using sensory bins. These objects include pretend foods, bugs, leaves, dirt, flowers, sticks, rocks, water, plants, animals, and other outdoor elements that the children can interact with. The literature reviewed gathers data on how outdoor learning interventions help or do not help children with ASD. Much of the literature is in support of outdoor learning and physical activity. This study integrates this information to create an accessible outdoor intervention program so kids can safely engage with stimuli and become desensitized to potential triggers.

Components of an Effective Grant Proposal

In person poster – Gymnasium

2:15pm – 3:15pm

Undergraduate Student(s): Leonine Greaves

Research Mentor(s): Jennifer Wade-Berg

United Way of Greater Atlanta is seeking to start a homeless initiative in Cherokee County, Georgia. For the initiation of any program or service, it requires a stream of funding. In the case of nonprofit organizations, grant funding is a source of revenue to support those services and programs. Grant funding is acquired by submitting a grant proposal to a funder through an application process meeting their requirements. This project identifies key components that all grant proposals should possess when pursuing grant funding. These key components were found by searching and analyzing peer-reviewed scholarly literature that details the nature and practice of grant writing. The themes prevalent throughout the literature were identified that make a well-written and persuasive grant proposal. Themes of effective grant writing identified are seeking grants that align with the services and programs to be funded, meeting the requirements outlined by the funding source, and understanding the audience that is to be the reader of the grant proposal. With this identification, a guide i.e., boilerplate for creating

a grant proposal that will effectively address the criteria required by the funder and demonstrate the results of an intended program resulting in earning grant awards.

How to Establish Growth within the Internship Program

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Erica Little

Research Mentor(s): Jennifer Wade-Berg

How to establish growth within the internship program? The purpose of this paper is to answer this question. In addition, helping build an efficient internship program transitioning interns into employees. Agencies using internship programs as a recruiting system are not uncommon. Studies have shown what makes an efficient program but lack in analyzing how agencies can advertise themselves, organize, and connect interns' interests. The work uses qualitative and quantitative data to help answer the question through agencies' surveys, documents, and interviews. Interns know what they want and do not want through the experience of the program. The agency needs to establish a connection to understand the interns' interests to help them grow to be long-term employees.

All About the Pandemic Within the Nonprofit Sector: An Analysis Review for Douglas County Task Force on Family Violence, Inc.

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Vanessa Macedo

Research Mentor(s): Jennifer Wade-Berg

The COVID-19 pandemic not only has affected people's health and finance all over the world, but it has impacted nonprofit organizations in several ways. During times of crisis, nonprofits become even more essential to support communities. This is the case for the Douglas County Task Force on Family Violence, Inc. (DCTF), a nonprofit organization that provides support and help for people within its community that is experiencing or have experienced violence. For this reason, it is important to understand how the COVID-19 pandemic has impacted different aspects of nonprofit organizations, how they have responded to lessen those impacts and any new strategies that can be implemented. Thus, the overall purpose of this research is to recognize the impacts this ongoing crisis (the COVID-19 pandemic) has had on nonprofit's operations and their service delivery and identify approaches that nonprofits have taken to counteract the effects of the COVID-19 crisis. Qualitative data will be gathered through a review of scholarly literature and will be evaluated using a thematic analysis method by identifying common themes throughout the data. Data will also be collected by conducting interviews with staff and multidisciplinary team members from the DCTF. Secondary quantitative data will also be gathered from service satisfaction surveys that the agency already implements. The results will be a deliverable that will apply specifically to the DCTF, which will incorporate conclusions from the

quantitative and secondary qualitative data. Conclusions will include strategies and suggestions specifically for the agency.

Creating a Mass Donation Solicitation Plan for Special Needs Cobb

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Alexa Waters

Research Mentor(s): Jennifer Wade-Berg

Nonprofit organizations depend on donations from individuals to support their mission and execute their programs. Mass donor solicitation campaigns require planning tailored to the organization, based on the agency's size, financial capabilities, and mission (Klein, 2016). This applied research paper analyzes scholarly information and best practices to create a mass donor solicitation campaign for a specific mid-sized nonprofit organization. Qualitative research was conducted first by reviewing literature written by expert fundraisers such as Mal Warwick (2003), Kim Klein (2016), Heather Mansfield (2014), as well as scholarly research conducted on solicitation and related concepts. Topics reviewed included nonprofit solicitation methods; cost-effectiveness of methods; ability to engage in donor relationships; applying concepts of psychological written appeals; the role of technology; and generational differences between donors. Secondly, interviews were conducted with the staff of DO Marketing, Special Needs Cobb's contracted marketing team, and Executive Director Debbie Day. Information ascertained was used to create a template for a one-year donor solicitation plan combining all the solicitation methods explored in this paper. The solicitation plan includes a general timeline to execute each method; sample emails, letters, and texts; a sample crowdfunding page, and a sample direct marketing mail.

The Effects of Youth Leadership in an Organization

In person poster – Gymnasium

10:30am – 11:30am

Undergraduate Student(s): Ashley Francis

Research Mentor(s): Jennifer Wade-Berg

The field of youth work and youth leadership is becoming more widely known throughout nonprofits and organizations. Contrary to what is said about youth leadership programs, there are many benefits that these programs provide including, increased loyalty to the organization, increased awareness, and increased funding, as the research throughout this suggests (Redmond & Dolan, 2016). While these benefits are positive, many organizations cannot create sustaining and beneficial youth leadership groups. The purpose of this study is to review the literature and data on why youth programs are valuable and discuss the necessary management needed to create these programs that output positive benefits. While this may seem like a simple task, creating youth programs relies on a manager who can give it their full attention and abilities. The overarching goal of these programs is simple, to develop leadership skills in youth and foster mentorship. Fostering these skills is what eventually leads to

beneficial youth groups, thus leading to a more increased awareness in Make-A-Wish Georgia and their mission.