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## 2020 - The Twenty-fourth Annual Symposium of Student Scholars

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# 24<sup>th</sup> *Annual*

## SYMPOSIUM OF STUDENT SCHOLARS

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## VIRTUAL EDITION

APRIL 2020

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*Recognizing excellence in student scholarship and creative activity*



**KENNESAW STATE**  
UNIVERSITY

# 24<sup>th</sup> Annual Symposium of Student Scholars

April 16, 2020

## Program

- 9:30am – 12:00pm: Concurrent Sessions
- 12:00pm – 1:15pm: Lunch Discussion Sessions
- 1:30pm – 4:45pm: Concurrent Sessions

# Abstracts

# Bagwell College of Education

## Elementary and Early Childhood Education

### ***What About Africa? An Analysis of What School Curriculum Teaches U.S. Students About Africa***

Oral Presentation - [Join now.](#)

9:45am – 10:00am

Undergraduate Student(s): Agazeet Haile

Research Mentor(s): An Sohyun

*Africa has long been the continent against which Europeans have racially defined themselves. Constructing a white and Western identity in opposition to Black Africans, so that they are believed to be uncivilized barbarians incapable of rational thought, produced Eurocentric ideologies necessary to exploit African people and resources, expand European empires, and subjugate, enslave, and ssacre Africans and their descendants during the era of colonial expansion. These ideologies continue to shape conceptions of Africans internationally, as they linger in popular political and media discourse within individual nations. But where are these discourses learned? Educational and cultural scholars argue that school texts play a central role in shaping how people view their nation's history, racial groups, and racial power hierarchies. School texts are written from a Eurocentric perspective often emphasize Western superiority and perpetuate colonialist ideologies and histories by excluding the voices, experiences, cultures, and histories of dominated groups both nationally and internationally. Therefore, there is a critical need to examine and transform school texts toward a more accurate and inclusive representation of Africa and Africans. Our research involves critical content analysis of history/social studies curriculum standards from all 50 states of the United States. Curriculum standards shape the content of the textbooks, teacher materials, and assessments. By analyzing the history/social studies curriculum standards, we aim to investigate what messages that U.S. schools send to students about Africa and Africans. The preliminary findings include: 1. Despite some progress in the amount and accuracy of ilormation about Africa and Africans, school curriculum still remains Eurocentric in focus. 2. Most curricular focus is on the teaching of slavery and colonization whereas little attention is paid to modern history about Africa. 3. Compared to secondary education, almost little to no content about Africa/Africans is included in elementary curriculum. The implications to curricular transformation will be discussed in the conference.*

### ***Education in Australia/ New Zealand vs. United States***

Oral Presentation - [Join now.](#)

10:15am-10:30am

Undergraduate Student(s): Lauryn Calloway

Research Mentor(s): Yanghee Kim

*The purpose of this research paper is to examine the possible differences between the education systems in Australia/ New Zealand versus the Education system in the United States. This paper will cover a variety of topics such as Early Childhood Education Goals and Outcomes, Birthing process, midwifery, and home births, Parenting for neonatal and early childhood, Intervention strategies with young children and their families, Minorities in the country and educational support for them, Teacher education, qualification, and benefits, ECE Policy Reviews and other useful information. The goals are to research and compare the results to one another.*

### ***Education in India Research Paper***

**Poster Presentation - [Join now.](#)**

9:30am-9:45am

Graduate Student(s): Sapna Patel

Research Mentor(s): Yanghee Kim

*Early Childhood Education is a term that usually refers to the period of time from the child's birth through when they are entering kindergarten. Early childhood education programs whether it is in United States or a different country, it is extremely important for a child's development. In these first few years of the child's life, they develop interests that will stay with them for the rest of their lives and they learn how to interact with the people all around them including peers, educators and parents. Children develop social skills, cognitive, mental, physical and other objectives of early education. These years determine the foundation of the child's learning and development. Education programs are largely determined by supportive community and supportive family members, no matter where in the world they are in. Children who usually attend early childhood education program tend to be more competent and confident in their activities throughout the day. These programs have incredible benefits that can follow into adulthood as well.*

### ***Brazil's Education Policies***

**Poster Presentation - [Join now.](#)**

2:30pm-2:45pm

Graduate Student(s): Nneka Amah

Research Mentor(s): Yanghee Kim

*In this paper, I will be discussing the difference between Brazil and the U.S. There are differences and similarities of Early Childhood Education program, Creative Curriculum, in the United States and Brazil's National Education Plan (PNE). The difference between ECE in the United States and Brazil is in the United States there are different programs such as Creative Curriculum and High Scope, but in Brazil, they have a National Program that includes their goals and strategies for education. They also have a decentralized policy which shares educational responsibility with all three parts of their government. I will look at the comparison of the PNE's goals to the Creative Curriculum's through the lenses programs such as Foundations for the Future School located in the U.S.*

### ***Native Americans: Invisible Mirrors & Cracked Windows***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Ashley Sadler

Research Mentor(s): Sohyun An

*The purpose of this project was to analyze the traditional narrative in relation to how Native Americans are depicted in public schools across America. The traditional narrative, which can consist of textbooks, literature, videos, etc. often present inaccurate, harmful, and ignorant stereotypes about Native Americans to students. Often the instructional methods related to the subject of Native Americans provide students with little to no opportunities to explore both their history and cultures in multiple manners. Often presented as a monolithic group, the traditional narrative has done little to present Native Americans in a dynamic, positive, and realistic manner. Focusing on the counter-narrative will help educators better present their students with a more realistic depiction of Native Americans throughout time. Critical thinking and Culturally Responsive Teaching are crucial if educators want to provide the students with the opportunities to expand their knowledge and understanding of various cultures around them.*

### ***Research on Mexico ECE***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Cristina Lopez

Research Mentor(s): Yanghee Kim

*My research shows early childhood care and education in Mexico, which focuses on the first years of life from birth through six years of age. The objective is to describe national policies and efforts which regulate the instruction of young children. Also, my research indicates the status of early childhood education programming and birthing processes and compares the possibilities for improvement of education for children in Mexico.*

### ***Unsung Muslim-American Women Heroes***

Oral Presentation - [Join now.](#)

10:00am-10:15am

Undergraduate Student(s): Natasha Dossani, Haley Ward

Research Mentor(s): Sohyun An

*Which Muslim-American women made an impact on the world? How can educators integrate inspiring Muslim-American women into an elementary social studies curriculum, centered around Anglo-Saxon culture, experiences, and history? The purpose of this presentation is to provide “mirrors and windows” to brilliant women, that have been traditionally marginalized throughout American history (Bishop, 1990). Schools are doing an injustice to their students by excluding content about Muslim-Americans*

*in the mainstream curriculum. Our research will bring attention to unsung Muslim-American women, who are often unknown to students and teachers. We will highlight the women's achievements, courageousness, and perseverance to bring about change, in society, and we feel that these women should be included in elementary classrooms, around the country. Additionally, our presentation will include content knowledge and a number of suggested resources that can be used to further elementary social studies instruction on Muslim-Americans. The research will contribute to a better and equitable social studies education that will not only allow for Muslim-American women's voices to be heard and celebrated, but will also empower young girls, and help students view experiences from a multicultural perspective.*

### ***Bias Within State Standard***

Oral Presentation - [Join now.](#)

10:30am-10:45am

Undergraduate Student(s): Allison Gilbert, Ali Sapp, Molly Wilson, Callie Hendrix

Research Mentor(s): Sohyun An

*What do you think of when you think of Native Americans? Pocahontas being rescued by John Smith. Native American women sewing clothes made from animal skins while the men are hunting with arrows. These are common themes that we think of when thinking of Native American History. In the Georgia state standards, Native American Culture is highly unappreciated. In kindergarten, students learn about Thanksgiving and the people it involves. First grade briefly mentions colonization. Second grade highlights the Cherokee Alphabet created by Sequoyah, and the Georgia Creek and Cherokee cultures. Third grade goes a little more in-depth by talking about European exploration and American Indian development. It continues to get more and more vague as children progress through school. However, social studies is a very bias subject. Who decides what is important for our students to learn about? Who decides how much detail they cover and from what point of view it is told? As future educators, we have created a storybook that talks about unsung Native American heroes that were mentioned in the Georgia State Standards. Their stories are untold and forgotten about within Georgia school systems. As educators, many think our job is to teach the standards presented to us and help students prepare for state tests. Early social studies classes prepare the next generation to become critical thinkers, explorers, and unbiased citizens. Together we stand to prepare our students to be the best that they can be.*

### **Inclusive Education**

#### ***Promoting Bilingualism and Biculturalism in Culturally and Linguistically Diverse Families in South Korea***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Jooeun Kim



Research Mentor(s): Jayoung Choi

*In 2006, the South Korean government set forth a policy supporting Korean education for culturally and linguistically diverse (CLD) children, indicating they were incapable of learning “proper” Korean under foreign parents (Hong, 244). Considering how such children continue to be deprived of the right to acquire mother tongue in the South Korea, there have been recent efforts to develop bilingual coaching programs. In the long run, examining how it can be practically implemented and sustained as a helpful program can contribute to CLD children’s bilingual and bicultural development. The current study aims to explore perspectives and experiences of bilingual coaches who work at a local Health Family Support Centers in Seoul, South Korea. Data for this study was collected through close interviews ranging from 70 to 120-minutes with three bilingual coaches, who were originally from China, Japan, and Vietnam, respectively. The personal experiences of the interviewees were analyzed through their own narrative, and it was indicated that all three coaches emphasized the immigrant mothers’ dedication to bilingual education to encourage bilingualism in their families. Bilingual coaches would also share of their own experiences as immigrants in South Korea when coaching CLD families. While they found the work rewarding, they also pointed out the challenges they faced, which included lack of expertise in early childhood education and the need to coach families a language in which they lacked proficiency. This research can be prospective for future developing policies, programs, and practices for CLD families and children beyond the South Korean context.*

## Coles College of Business

### Marketing & Professional Sales

#### ***Amazon: Out of its Prime in China - An International Marketing Case Study***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Ryan Hunter, Madison Floyd, Andie Glover, Jessica Golden, Conner Hogan, Don Kim, Austin Masenthin, Michael Smoak

Research Mentor(s): Mona Sinha

*Amazon, a billion-dollar global online shopping company in many countries including the US and Europe. However, despite its global success and domination of the e-commerce industry, Amazon has struggled to succeed in China. Amazon entered China in 2004 by buying out a local book-selling business Joyo for \$75 million, but faced a slew of challenges: slowing Chinese economy, growing Chinese nationalism due to the US-China trade war, and battling a well-established competition with Alibaba and JD.com. Alibaba and JD.com operate faster and more efficiently and control 61.5% of the market share in China growing rapidly with an estimated growth rate of 50%. In 2019 Amazon’s revenue in China was \$87.4 billion compared to Alibaba’s \$23.2 billion (Richter, 2020). Amazon’s strategy did not*

*align with the Chinese consumers' demand for higher quality products and larger discounts on products. Amazon announced that it would no longer operate a third-party marketplace or provide seller services in China but will continue to have a smaller presence there. This case examines economic, socio-cultural and competitive conditions to suggest changes that Amazon would need to make in its marketing strategy in order to succeed in China.*

### ***From Delhi to Mumbai, Apple Seeks a Bigger Slice of The Pie - An International Marketing Case Study***

Poster Presentation - [Join now.](#)

3:45pm – 4:00pm

Undergraduate Student(s): Taylor Greer, Brent Cassidy, Mike Williams, Nick Hill, Chandler Burger, Adam Pedraza, Steven Wehde, Caleb Fortney

Research Mentor(s): Mona Sinha

*Apple Inc., headquartered in the United States, is the world's largest technology company with revenues of \$265 billion as of 2018 (Johnson, 2012). Apple has been trying to compete in India's smartphone market, the world's fastest-growing and second-largest smartphone market globally, accounting for nearly 30 million purchases per quarter (Sheth, 2019). Despite its success in the U.S., Apple has not been able to overcome the unique challenges it faces in India. It faces entrenched Asian competitors like Xiaomi, Samsung, Vivo, and Oppo, who have a dominant share of the market. Indian consumers are very price sensitive and value deals (Lu, Yu, & Soman, 2016) which means Apple's high-quality, premium pricing strategy only appeals to a small segment of affluent consumers. However, its competitors offer similar or even more localized features, at much lower prices. Indeed, over 75% of smartphones sold in India cost less than \$250, whereas the iPhone is priced starting at \$550 or higher (Cohan, 2018). Apple also faces other challenges in India, such as limited Internet connectivity, sourcing issues due to the government's "Make in India" initiative, and limited consumer purchasing ability (Kashyap, 2017). This case study examines Apple's overall marketing strategy in India in the context of the smartphone industry, competitors, consumer attitudes and government regulations. This case study will initiate discussions on how Apple must adapt its strategy to be able to succeed in India's growing smartphone market.*

### ***Amazon: A Maze Through China - An International Marketing Case Study***

Poster Presentation - [Join now.](#)

3:15pm-3:30pm

Undergraduate Student(s): Dylan Calder, Alessandro Correia, Skylar Curry, Omar Diaz-Rios, Hanane Goubil, Jahnae Jones, Sylvia Newsome, Odisan Sisavath

Research Mentor(s): Mona Sinha

*Amazon is an e-commerce technology company best known for its fast-delivering time and for being one of the tops of the big four technology companies in the United States. Despite its success in the U.S. and several countries abroad, it has struggled to succeed in China since 2004 where Alibaba and JD.com*

control 82% of the market. This is due to Amazon failing to compete with Alibaba and neglecting to acclimatize their online offers to appease Chinese customers' preferences. An example of this is that Alibaba has its own payment system called Alipay, while Amazon had yet to include its own and unique payment system in China. Another example is something as small-scale as Amazon's website. Alibaba's and JD websites are bright, colorful that incorporate a collection of ads, while Amazon's is simple and minimalistic -- a design that appeases American preference (Martin, 2019). Overall, this gives Alibaba and JD an increased and extensive apprehension of Chinese local tastes. Following, China's e-commerce industry is amongst the largest in the world with \$1.935 trillion in revenue (Williams 2019). However, Amazon has recently had to shut down its distribution centers in China due to being unprofitable and stagnant. (Dastin, 2019). Another reason for Amazon's downfall in China was due to numerous government regulations placed on them, from a limit on cloud services to taxes (Essays, 2018). This Case Study explores the challenges that Amazon faced in competing against Alibaba and JD.com in China and why it could not replicate its success in the United States.

**TransFORDming China with Electric Vehicles - An International Marketing Case Study**  
**Poster Presentation - [Join now.](#)**

2:30pm – 2:45pm

Undergraduate Student(s): Jasmine Washington, Koran Baraka, Teyana Pryor, Kaleb Bell,  
Dylan Newman, Kyle King, Bryce Lee

Research Mentor(s): Mona Sinha

Ford is a legendary automobile company established in the United States in 1903 by Henry Ford. Ford is a \$1.35 billion company worldwide with operations in 10 countries, but it has experienced an annual drop of roughly eight percent in the last year (Wagner, 2020). Ford entered China's automobile industry in 2004 when automobile sales totaled 215,600 vehicles (CEIC). In 2001, Due to the high level of pollution in the country and main cities, the electric vehicle industry in China has grown in recent years, and Ford has said that it plans to introduce 15 battery electric or plug-in gasoline-electric hybrid cars in the market by 2025 (Bradsher, 2017). Accordingly, Ford introduced their first small electric SUV named the Territory EV that is exclusive to China. With their new Ford China 2.0 blueprint, Ford intends to release 30 cars over the next three years, with ten of them being electric vehicles (Ford China 2.0). Ford has also announced their plans to bring the all-electric Mustang Mach-E to China in 2021, a release expected to rival some strong competitors (Bo, 2019). Although sales of EVs are booming in China, the market is dominated by numerous small domestic manufacturers and Ford also faces competition from multinationals like Tesla (Bo, 2019). This case study examines Ford's market performance in China in the context of the industry and consumer preferences, in order to suggest changes to its marketing mix.

**Zara: Facing Fast Fashion Challenges in China - An International Marketing Case Study**  
**Poster Presentation - [Join now.](#)**

4:00pm-4:15pm

Undergraduate Student(s): Daniela Schaich Graniel, Alexxus Finnell, Caitlin Hopkins, Candace Salters, Elimay Baez, Larissa Hernandez, Madison McIntyre, and Raven Lee  
Research Mentor(s): Mona Sinha

*Zara, one of the largest international fashion companies, was founded in Spain in 1974. It has a brand value of \$18.4 billion and global revenues of \$ 28.22 billion in 2018. Zara entered China in 2006 to compete in its \$5.58 billion fast fashion market (Ge, 2018). China is an attractive emerging market with a GDP of \$13.6 trillion, growing at 5.9% (World Bank, 2019). Zara's fast fashion typically appeals to young college students and the middle class with income ranging from \$7,250 to \$62,500, representing about 39% of the population (Cyrill, 2019). In China, Zara targeted young women entering the work force who were looking for affordable yet high-quality, timeless Asian style clothing. However, the fast fashion industry has been declining in China due to several reasons: high shipping costs, high levels of competition influenced by customization, fast paced rotation of designs, e-commerce, and collectivist cultural values of the consumers. Moreover, local Chinese stores are moving upmarket by offering more affordable clothing with a higher perceived value and this has also affected Zara negatively (Jun, 2019). This case study provides an overview of China and its fast fashion industry, consumer preferences, competitors and the cultural as well as socio-economic context in which Zara needs to compete. An analysis of Zara's current marketing strategy in China provides insights into how it should change its marketing mix in order to succeed.*

## **IKEA: GROWING THE MARKET IN INDIA – AN INTERNATIONAL MARKETING CASE STUDY**

Oral Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Geena Lawrence, Alexis Harvey, Jordan Hunter, Ayisha Mohammed, Will Nolan, Laura Stallings, and Chavis Jones  
Research Mentor(s): Mona Sinha

*India is a rapidly growing emerging economy with a \$2800 billion GDP and a 1.2 billion population (Trading Economics, 2020). The Indian furniture industry is worth \$32.61 B USD with an expected growth rate of 13.38% (India's Furniture Market, 2019). IKEA is a 77-year old global Swedish furniture manufacturer with a revenue of 41.3B € (O'Connell, 2019) and a presence in 52 countries (Owuor, 2019). IKEA's key competitive advantages have traditionally been low priced, modern, furniture of high quality and durability. The very first IKEA was set up in India in 2018 (Tandon, 2018), however, face many challenges such as, space constraints for large stores, generating revenue, and cultural concerns. (France-Presse, 2018). Due to space constraints, multi-generational Indian families live in very small homes and so rooms often serve multiple purposes (Agarwal & Bellman, 2018) and Ikea's furniture needs to cater to such unique needs and lifestyles. Ikea faces strong competitors such as Pepperfry, India's largest online furniture retailer and presently the top furniture retailer (Bushe & Joshi, 2019). IKEA also faces stiff competition from small mom & pop stores that dominate over 90% of the Indian retail market and offer low priced, custom made furniture. The*

*overhead costs of these stores are less than half that of major retailers and so Ikea cannot use its “low price” positioning in India (Horvat, 2018). This case study examines the many challenges that IKEA faces in India and suggests changes to its marketing mix.*

### ***Mobike: Backpedaling Out of India - An International Marketing Case Study***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Brant Schwendel, Madison Tumey, Madison Godwin, Lauren Lance, Rachel Pastoric, Ashley Reese, and Caroline Phillips

Research Mentor(s): Mona Sinha

*In the past few years, the bike-sharing industry has gained traction in large cities and suburban areas all over the world. Mobike, an app-based bike-sharing company founded in China in 2015, introduced a new, efficient and eco-friendly mode of travel for short commutes using smart bikes which are bikes with a motor that help assist the rider's pedal-power. Bike-sharing has grown into a booming industry due to rapid urbanization, traffic congestion, and pollution problems. Mobike entered India in 2018 but faced many challenges. Since the takeover and expansion of Mobike, Meituan, the holding company, has suffered a loss of 4.6 billion yuan (\$680 million), which is triple the bike-sharing business contribution of 1.5 billion yuan (Liu, 2019). These problems have been seen industry-wide as interest in bike-sharing has been waning and the industry, especially start-ups, are not adequately regulated (QP software, 2019). Challenges for Mobike in India include low literacy, aversion to cashless payments, and privacy concerns. Additionally, public transportation is a popular mode of travel and most cities do not have designated bike lanes. Indeed, India just doesn't have the same “bike culture” like China. This case study focuses on how Mobike needs to adapt its marketing mix to address consumers' needs while tackling the many challenges it faces in India.*

### ***Zara in China: Fashionably Fast - An International Marketing Case Study***

Oral Presentation - [Join now.](#)

9:30am-9:45am

Undergraduate Student(s): Katherine Cameron, Sammy Al-moukadem, Mark Boutilier, Mark Hamilton, Allison Jeffcoat, Matt Lee, Martina Mai, Marie Price

Research Mentor(s): Mona Sinha

*The fast fashion industry is worth \$35 billion USD (2019 Fashion Resale Report, 2019). Zara, a global fast fashion brand owned by Inditex, brings in an average annual revenue of \$20.6 billion. Zara entered China in 2006 with its affordably priced fast fashion products, the market for these products is worth \$295.2 million (Sofya, 2019). Currently, Zara's top competitors in this market are Uniqlo and H&M. Other global competitors such as Topshop and Gap Inc launched stores in China but pulled out after experiencing poor financial performance (MarketLine, 2015). Zara faces unique challenges upon its rapid expansion into the Chinese market. The overall economy of China is slowing down which poses as a threat to an industry that is classified as nonessential. Additionally, Zara is faced with overcoming the*



*increased adoption of ecommerce and mobile shopping that Chinese consumers have rapidly adopted. A second challenge is local Chinese apparel giants like Peacebird, Heilan, and Septwolves that are approximately ten times more stores than Zara (Towson, 2017). This case study examines China's fast-fashion industry in the context of its consumer preferences and socio-economic situation to better understand what changes Zara should implement in its marketing mix in order to succeed in China.*

### ***Mobike's Bike-Share Battle in India - An International Marketing Case Study***

Oral Presentation - [Join now.](#)

9:45am-10:00am

Undergraduate Student(s): Amber Cranston, Savannah Rubio, Sam Kroll, Austin Tudor, Eric Jacobs, Evan Coulter, and Miguel Pereira

Research Mentor(s): Mona Sinha

*Mobike, the world's first cashless and station-free bicycle service, launched in Shanghai in 2016 and now operates in over 19 countries including India (Khanna, 2017). Growing urbanization has led to increasing traffic congestion and pollution in most large cities around the world. Recently, there have been increasing calls for more sustainable transportation methods and one solution that is becoming popular is bike-sharing. The global bike ride-sharing market is projected to be worth around \$8.6 billion in the next year with a compound annual growth rate (CAGR) of about 6.5% over the next 5 years (Wagner, 2018). Mobike aims to reduce congestion, create a greener environment, solve short-distance connectivity problems, and improve the quality of life for everyone with efficient and inexpensive alternative transportation methods. Mobike entered India in 2018, a seemingly attractive market given the low ownership of vehicles and the many transportation and traffic problems. With 30% of India's 1.2 billion population living in dense urban areas, mass amounts of traffic congestion is costing cities roughly \$22 billion a year (Tandon, 2018). Despite the need for short and mid-distance mobility within urban areas in India, Mobike is facing major challenges such as heavy competition, sustainability issues due to the littering of broken bike parts, government regulations, etc. Moreover, Indian consumers perceive biking to be for the poor (Chen, 2018). This case study examines the economic and cultural context of the bike share market in India to propose changes in Mobike's marketing strategy to help it succeed.*

### ***IKEA: The Swedish Invasion of India - An International Marketing Case Study***

Oral Presentation - [Join now.](#)

10:00am-10:15am

Undergraduate Student(s): Isabella Vranesevich, Ayesha Babar, Megan Cooney, Garrett Evans, Caroline Syed, Riley Proshek, and Sergio Infante

Research Mentor(s): Mona Sinha

*Ikea is a Swedish furniture retailer with 2019 revenues of \$41 billion euros and a global presence across 37 countries. Ikea is known for low, priced, modern, do-it-yourself furniture in flat accessible packaging (Dudovskiy, 2019). Ikea's retail sales have had a 6.5% growth rate in the past year (Magnusson, 2019)*

*and is one of the top global furniture retailers. Ikea entered India, it's 37<sup>th</sup> country, in 2006. India is a high growth emerging market with 1.2 billion people, the second highest in the world (Nagy, 2019). However, Ikea transitioned from market research and selling pens and paper, to self-assembling furniture only in 2018 (Ikea History). Ikea faces stiff local competitors of which a few are branded while the vast majority are local mom and pop stores selling customized furniture that are priced much lower than Ikea's. Moreover, Ikea's "do it yourself" assembly process is culturally a foreign concept for Indians who regularly outsource chores given the wide availability of low-cost labor (Goel, Ritika, Garg, & Shraddha, 2018). One key advantage for Ikea is that its' products focus on space saving which is very relevant in Indian urban areas where people live in very small living spaces with extended family members. Thus, Ikea has many opportunities in India but also faces critical challenges. This case study examines the Indian furniture market, competitors and consumers, in order to propose a change in Ikea's marketing mix to help it succeed in this market.*

### ***How can Apple be more Fruitful in India - An International Marketing Case Study***

Oral Presentation - [Join now.](#)

10:15am-10:30am

Undergraduate Student(s): Isabella Bertolani, Pamela Diaz, Zack McPherson, Amani Elchaar, Michal Kardacz, Kamari Davis, Nakia Abdul, and Lawrence Ofili

Research Mentor(s): Mona Sinha

*Apple, founded by Steve Jobs and Steve Wozniak in the United States in 1976, is a \$91.8 billion, leading global technology company with 61% of revenue coming from international sales ("Apple Reports,"2020). Apple markets its iPhones in 26 countries and entered India with its iPhone 4 in 2011 ("The 15 coolest"2019). India is an attractive emerging market with a 1.37 billion population, \$280 billion GDP, 5% growth rate, and a mobile phone penetration of 502.2 million (Worldometer 2020; India GDP 2020; "15 coolest" 2019). India has about 400 million smartphone users which is expected to grow to 440 million by 2022 ("Number of smartphone users in India 2015-2022", 2020). However, Apple soon discovered that the market was dominated by Asian brands like Samsung from South Korea and Xiaomi, Oppo, and Vivo from China, all providing devices with localized functionalities for lower or similar prices as Apple ("India-Popular smartphones by company 2019, 2020"). These Asian brands jointly have over fifty percent of the market share whereas Apple has less than two percent (India-Popular smartphones by company 2019, 2020"). While the middle class in India has grown exponentially, the \$1,000 or higher price tag for an iPhone is a huge deterrent. The case study focuses on the mobile phone industry in India and the adaptations that Apple needs to make to its marketing mix in order to compete successfully.*

### ***Electric Vehicles Leading in China, Ford is a Few Cars Behind - An International Marketing Case Study***

Poster Presentation - [Join now.](#)

3:30pm – 3:45pm

Undergraduate Student(s): Jacob Murfin, Katie McCombs, Tyler Lehman, David Whitehead, Hayden Harrison, Chris Sterling, Brianna Vangordon  
Research Mentor(s): Mona Sinha

*As the world is looking at sustainable energy sources, electric vehicles are likely to be a big part of the perceived future. China has 18.47% of the world's population, is one of the highest emitters of carbon dioxide, and is the world's largest market for electric vehicles (Country Meters). China's GDP was USD 13.608 trillion in 2018 and is expected to increase substantially in coming years (Wang, 2019). With 25 million vehicles sold in 2019, China's automobile market is the biggest in the world. With that, China accounts for 27.52% of the world's CO2 emissions (Statista). To decrease that number, China stated in 2019 their goal was to have 60% of all automobiles sold in 2035 to run on electric motors (Tian, 2019). With car sales in China declining rapidly over the past 3 years, automobile companies are looking for a way to develop a sustainable competitive advantage. Ford Motor Company, a \$156 billion global leader, has been struggling to compete in China and is now looking to the electric vehicle market as a way to expand. However, China's EV market is hypercompetitive with over 400 domestic EV manufacturers, including some multinationals like General Motors. To differentiate themselves from the competition, Ford announced plans of building facilities that will specialize in creating technology for their EV's. SYNC+ is a popular technological option available to enhance the consumers experience (Media Ford, 2019). However, investment in technology could raise the prices of their vehicles. With annual income in China at about 82,413 yuan (\$11,727 USD), raising prices may not be an option for Ford (Statista). This case study discusses the many challenges that Ford faces in China and how it needs to change its marketing mix in order to succeed there.*

## **Information Systems**

### ***Using NeuroIS Tools to Understand How Individual Characteristics Relate to Cognitive Behaviors of Students***

Poster Presentation

Not Presenting

Graduate Student(s): Tae Jones

Research Mentor(s): Adriane Randolph, Kimberly Cortes, Cassidy Terrell

*NeuroIS tools have increasingly been used to examine cognitive behaviors in educational settings. Here we present results of ongoing work applying neurophysiological tools to examine the cognitive load of student learners in the context of chemistry education. In particular, we investigate how individual characteristics relate to the Pope Engagement Index for students interacting with an information system for visualizing molecules. Characteristics such as gender, medication affecting alertness, hand dexterity skills, and levels of athleticism were found to significantly correlate with cognitive load.*

### ***Understanding Systems Usability and User Experience for Faculty Accessing Concept Inventories***



Poster Presentation

Not Presenting

Undergraduate Student(s): Emily Onofrey

Research Mentor(s): Adriane Randolph, Kimberly Cortes

*Usability of web applications is something that researchers pour a lot of time in to understanding. The front end of a system must be designed to make it as intuitive as possible to understand what data the user needs to get and make it as easy as possible for them to retrieve it. The research I have conducted was inspired by these two main points and how to relate accessibility to concept inventories for faculty -- particularly in subjects of chemistry, biochemistry, physics, and biology. There is no search repository that is currently standing that faculty can use to find research-based concept inventories. Hence, the main purpose for this research was to address how we can create a concept inventory that is tailored to the end user. iMotions technology was used in the usability study to track eye movement, video, audio, and screen input, as well as an expressions analyzer for emotion. I gathered data from the user while they interacted with the current concept inventory called SCI Hub. With the information gained from the study, I will make enhancements to SCI Hub's front-end user interface to better suit the needs of the end user. The end goal is to confidently establish a web application that addresses the natural human interaction with computers, the user's experience, and finally the functionality and usability of the application.*

## College of Architecture and Construction Management

### Architecture

***The Urban Network: An Ecosystemic Framework for the Enhancement of Atlanta***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Undergraduate Student(s): Caleb Lawrence

Research Mentor(s): Edwin Akins

*The city can be considered to be one of the most delicate and intricate ecosystems on the planet, as it defines the organization of the functions and systems that make up every day human life. With the continuing trends of rapid population growth and urbanization, it is imperative to thoroughly and regularly examine the network of the city to ensure the continued ability of the urban model to sustain an adequate and resilient quality of daily life. The network of certain cities, like that of Atlanta, must be challenged to develop towards that of a distributed network. The goal of a distributed network is to prioritize connectivity and density over continued sprawl. This thesis, "The Urban Network," applies a framework of ecosystemic urbanism to analyze and subsequently enhance the overall network of the city of Atlanta by scrutinizing the urban fabric at a smaller, district scale. The process aims to improve the*

*overall network through this scalar application by validating proposals for new urban developments and design within the overall fabric of the city of Atlanta. This validation is based on the evaluation of four factors of ecosystemic urbanism — morphology, complexity, efficiency, and equity — to promote a more active and flexible urban fabric that provides an adequate and resilient quality of life to both the existing and future populations of Atlanta.*

### **Restoring History: Mixed-Use Hotel & Retail Center**

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): William Chase Sisk

Research Mentor(s): Marietta Monaghan

*Monroe, Georgia, is a unique small town, located halfway between Athens and Atlanta. The small-town atmosphere and amenities have become a popular destination for people attracted to the historic buildings, downtown events and UGA football home games. Monroe is popular for its wedding venues, antique malls, and car shows, but there are not enough hotel rooms. Currently within the historic downtown, there are only one bed and breakfast, two AirBNB's, and no hotels, although every downtown storefront is occupied by restaurants, retail stores, and businesses. The need for overnight accommodations has raised the possibility of a new mixed-use hotel and business hub facility containing retail spaces, an upscale restaurant, and event and ballroom spaces. One two story 1920s concrete building near the center of town is a candidate for rehabilitation. A razed neoclassical-style hotel is to be recalled in the design of the preserved structure, which will be built with modern techniques and sustainable innovation. My proposal is supported by the current needs of residents and local businesses, which presently lodge salesmen in nearby Athens. Local venues and other downtown events will sufficiently support operation of the hotel. Additionally, two self-guided walking tours of the downtown historic districts will attract tourists in the evenings and on weekends and will increase opportunities for commerce as the town center becomes more accessible. This significant historical preservation project can also be used as an example to promote social interaction and thus improve the life of other small cities in Georgia.*

### **Golden Scrutiny | Compositional Subtlety**

Poster Presentation

Not Presenting

Undergraduate Student(s): Devon Sams

Research Mentor(s): Peter Pittman, Elizabeth Martin, Ameen Farooq

*The research explores the golden ratio as a compositional system in architecture and design. Not only exploring its organizational qualities, but its ability to inform space and proportion in architecture. The methodology is designed around exploration of the system through stretching what its applicability in design and how I can, as a designer, utilize and prove the systems validity in architecture. The unique approach through my design is an interrogation of the works of the past to understand the uses of the*

*golden ratio in the past and how it can be applied today. In the process of this thesis it has been a challenge to decide on what architectural intervention is appropriate when such a system has so many different potential applications. The question of what is the best could not be decided, but what would offer the most opportunity for exploration. Through a series of follies I am developing iterations that explore the golden ratio as a design tool in composition of the follies through manipulation of the system geometrically and mathematically. In order to ground the research to a sense of a project location to easier visualize the experience of the project I chose a park close to home in need of renovation. Through this scholastic exploration I am able to superimpose my design with the intent to connect the park's visitors through the exploration of the follies. Creating a unique park experience that both allows me to create a tangible idea that can be placed, but also with the ability to create a new dynamic on the site. The research explores the sculptural space making ability of the follies and how people might interact with the concept.*

## **INFORMING SPACE: A HUMAN CENTERED APPROACH TO DESIGNING A(N) (ADAPTIVE) MODULAR DWELLING ON MARS**

Oral Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Hala Alfalih

Research Mentor(s): Jeffrey Collins

*With tech giants like SpaceX, Blue Origin, and Lockheed Martin teaming with NASA to spearhead the mission to Mars, this provides an opportunity for architecture and design to engage in the conversation of the inevitable future of space exploration. Research will explore structure, material, and form as a means of developing an adaptive and parametrically informed dwelling for the first astronauts that will land on Mars. This thesis explores the intersection of the physical built environment and the psychology of astronauts in a remote, foreign and harsh environment. How can a shelter provide the essential needs for humans to inhabit Mars while allowing humans to thrive both psychologically and physically? A biomimetic method will be explored concerning structure, through an investigation of previous research on the anatomical stability of lightweight structures which occur naturally such as cancellous bones, foams, and bubbles. The structure will subsequently inform the material which will be used on the surface of Mars. The use of in-situ resources like the abundant Martian regolith available to astronauts by the agency of robotic arms for an additive method of fabrication will ensure formation of strong sustainable structures. Previous approaches such as human-centered design and the seven principles of universal design will inform the volumes and spaces inside the dwelling. Structure and material will inspire the form, that responds to the harsh Mars environment (surface pressure, relentless dust storms, decreased gravity, etc). The form will then be iterated according to these conclusions with infinite outcomes that support the parametricism, flexibility, and individuality of the architecture. All of this will be conducted while simultaneously studying circulation, program, and adjacencies to uncover the connection between the built environment and its effect on psychology and solve the basic problems of living in a foreign environment.*

### ***From Displaced to Our Place: Using an Educational Narrative to Build Community in a Displaced Community***

Oral Presentation - [Join now.](#)

11:30am-11:45am

Undergraduate Student(s): Morgan Frederick

Research Mentor(s): Kathryn Bedette

*Thomasville heights is a displacement neighborhood for people pushed out by Atlanta's Urban Renewal projects. Thomasville Heights remains a casualty of a system of economic segregation. Under this system of segregation these neighborhoods are left in detrimental states. It is in places like Thomasville Heights where the phrase "place matters" becomes a call to action. A town of 6000 residents and only one elementary school, Thomasville heights is bordered by multiple freight yards, a cemetery, landfills, and Atlanta's US penitentiary, just a 5-minute walk from that one elementary school. There remains a vast difference between that of low-income urban, and suburban school facilities that has drawn little attention. My thesis examines the role of an elementary school in a low-income community. While it is accepted practice to use school facilities for community functions; community and educational design, remain in separate fields. By creating an interdisciplinary approach to community and school design; new strategies can be implemented to use combined educational grant and community development funding. By turning elements of the school inside out and extending the reach of the school into the community, this thesis will create a new strategy for designing educational neighborhoods in low income urban communities. This calls for planners, administrators, and architects to take an aggressive position on integrating design practices between schools and communities, especially in low-income areas, where financial and familial resources can be low, or otherwise not available. By fostering a relationship at many levels of a school's environment, this project creates a framework for the design of a didactic neighborhood, developing tactics of designing with nature, spatial sequencing, materiality, and playfulness. Architecture can facilitate a learning experience that also happens outside of the school walls, resulting in an approach which promotes education and well-being for the students and the community.*

### ***The Model Holistic: The Application of the Adaptive Cycle to Rust-Belt Cities***

Poster Presentation - [Join now.](#)

10:30am-10:45am

Undergraduate Student(s): Marysia LaRosa

Research Mentor(s): Edwin Akins, Liz Martin-Malikian

*For too long, the relationship between the natural and built environment have been ignored, resulting in a disconnect between humanity, nature, and architecture. Can enforcing this relationship change the way we think about urban design and resiliency? Like ecology, cities act much like an ecosystem, going through four phases: exploitation, conservation, release, and reorganization. Over a slow period, these resources are conserved and protected rather than used for innovation. In the case of a disturbance, the vulnerability of the system at this point leads to eventual collapse and release of resources. Finally, as a*

*result of this release, the system can reorient itself along a pathway toward a new phase of exploitation and regrowth. Together, these phases are known as the adaptive cycle, an ecological resilience model developed by two ecologists at the University of British Columbia, C.S. Holling and C.J. Waters. This work seeks to prove the adaptive cycle can be a holistic model for cities to establish architectural and urban strategies that increase city resiliency. A new method for analyzing city systems through the adaptive cycle can be a holistic way to prolong resiliency by, increasing density, diversifying industry, encouraging organizational autonomy, embracing all cultures, and generating new ideas. This thesis focuses on a second-tier Rust-Belt city, Utica, New York located about an hour North-West of the capital, Albany. This thesis seeks to apply the adaptive cycle model to Utica by targeting specific nodes within the urban context to place Utica on a positive trajectory of resiliency.*

## College of Computing and Software Engineering

### Computer Science

#### ***Learning Environment Containerization of Machine Learning for Cybersecurity***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Hao Zhang, Zhuolin Li

Research Mentor(s): Hossain Shahriar

*Machine learning plays a critical role in detecting and preventing in the field of cybersecurity. However, many students have difficulties on configuring the appropriate coding environment and retrieving datasets on their own computers, which, to some extent, wastes valuable time for learning core contents of machine learning and cybersecurity. In this paper, we propose an approach with learning environment containerization of machine learning algorithm and dataset. This will help students focus more on learning contents and have valuable hand-on experience through Docker container and get rid of the trouble of configuration coding environment and retrieve dataset. This paper provides an overview of case-based hands-on lab with logistic regression algorithm for credit card fraud prediction.*

#### ***Spam Email Detection: Comparison Between Naïve Bayes and Neural Network***

Poster Presentation - [Join now.](#)

2:30pm-2:45pm

Undergraduate Student(s): Zhuolin Li, Hao Zhang

Research Mentor(s): Hossain Shahriar

*Classification is an important technique to deal with cybersecurity threats. In this paper, we detect spam emails from publicly available dataset using Naïve Bayes and Neural Network (NN). The results from*



experiments show that for data sets with more balanced for classification, the accuracy of Naïve Bayes is better than NN.

## **Information Technology**

### ***Mobile Sensor-Based Fall Detection Framework***

Poster Presentation - [Join now.](#)

2:15pm - 2:30pm

Graduate Student(s): Md Saiful Islam

Research Mentor(s): Hossain Shahriar, Sweta Sneha

*Fall is a major concern among elderly population. Accidental fall if unattended for a long time, may lead to severe injuries and disability. Prompt detection of fall is an important research problem, particularly in the homecare settings for elderly citizens, where not enough service providers are available to monitor their health and welfare daily. There are some available fall detection approaches, however, they are either expensive or the accuracy of fall detection is not satisfactory. In this paper, we develop a low-cost fall detection framework using Android phones built-in sensors with the goal of detecting falls and notifying to emergency responders. We generate a dataset and train 3 popular machine learning algorithms to detect fall events: Logistic Regression, Naïve Bayes and Neural Network. Our study shows the performance comparison of the learning algorithms. The evaluation results show that our approach can successfully detect fall and neural network-based technique can perform better than other learning techniques.*

### ***Security and Privacy Analysis of Wearable Health Device***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Graduate Student(s): ABM Kamrul Islam Riad

Research Mentor(s): Hossain Shahriar, Chi Zhang

*Wearable technology allows for consumers to record their healthcare data for either personal or clinical use via portable devices. As advancements in this technology continue to rise, the use of these devices has become more widespread. In this paper, we examine the significant security and privacy features of three health tracker devices: Fitbit, Jawbone and Google Glass. We also analyze the devices' strength and how the devices communicate via its Bluetooth pairing process with mobile devices. We explore possible malicious attacks through Bluetooth networking. The outcomes of this analysis illustrate how these devices allow third parties to access sensitive information, such as the device exact location, which causes the potential privacy breach for users. We analyze and compare how unauthorized parties may access the user data and the challenges to secure user data on three wearable devices (Fitbit, Jawbone, and Google Glass) security vulnerability and attack type.*

# College of Humanities and Social Sciences

## Interdisciplinary Studies

### *A simulation of the dangerous spread of COVID-19 without isolation*

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Kory Illenye

Research Mentor(s): Joseph DeMaio

*An explanation of how COVID-19 would spread through Kennesaw State University (KSU) if precautions were not taken. Utilizing graph theory, computer simulation, probabilities based on student enrollment and the most recent information about COVID-19 to develop a sense of how quickly or slowly it would travel through KSU.*

## English

### *Fruits of Forced Desire: A Marxist Reading of Christina Rossetti's "Goblin Market"*

Oral Presentation - [Join now.](#)

11:00am – 11:15am

Undergraduate Student(s): James Greer

Research Mentor(s): Oumar Cherif Diop, Lara Smith-Sitton

*Christina Rossetti's 1859 poem, "Goblin Market," is a tale of two maidens fearful of goblin merchants who canter about the glen selling an array of tempting fruits. Outside traditional feminist interpretations, the poem demonstrates the Marxist theory concerning commodification and reification. The maidens reveal the process in which human beings become commodities, solidifying Marx's statement that: "the increasing value of the world of things proceed in direct proportion the devaluation of the world of men." Using specific aesthetic features common in the works of art during the Pre-Raphaelite movement, the poem further underscores the overall effects of laborer alienation and industrial aggression towards the working class, the negative dominance of capital and commodity fetishism through the supremacy of industrialization, the abundance (as detailed by the multiple fruits Rossetti describes) of available mass-produced goods, and the consumerist desire for such commodities. Furthermore, a comprehensive examination of Rossetti's application of rhythm and meter will demonstrate how the power of desire is manipulated and controlled by the goblin men to dehumanize the maidens, forcing them to assume the character of exchange-value, and ultimately selling their bodies for material desire. The multiplicity of viewpoints that Marxist theory presents in "Goblin Market" exposes the ills of class inequality, commodity persuasion, and the conformity of the mass population to the bourgeoisie, resulting in the dehumanization of the proletariat. This presentation is a stylistic analysis of Rossetti's poem to demonstrate how alienated the working class was in the mid-19<sup>th</sup> century.*

*Furthermore, by applying a Marxist analysis of the poem, conclusions will be drawn to further discuss how desire of commodity effects current affairs.*

### ***Native American Representation in Film***

Oral Presentation - [Join now.](#)

11:30am – 11:45am

Undergraduate Student(s): Matthew McCadden

Research Mentor(s): Lara Smith-Sitton

*This paper looks at the history of indigenous portrayals in popular culture and how it influenced future film makers to create the Native stereotype in film. The purpose of this research paper is to discuss the representation of Native Americans in film and how it affects people's perception of Native Americans. It looks at the negative associations with Native Americans that viewers tend to think of when viewing cinema, and it discusses the help and harm it has done to the Native American community. I used evidence from classic and contemporary films, Buffalo Bill's Wild West Show, older genre literature, and interviews from Native American actors to discuss the history and impact that stereotyping has had on the indigenous community. Multiple academic journals were cited, and my use of interviews by Native American actors and film makers shows the complexity of the situation working within the Hollywood system.*

### ***The Artistry of Leadership***

Oral Presentation - [Join now.](#)

10:30am-10:45am

Undergraduate Student(s): Ty Lawrence, Megan Eaton, Lindsey Sanders, and Rebakah Love

Research Mentor(s): Rochelle Harris Cox

*Almost all community organizations and businesses have a mission. In Cobb County, there are several groups that take their mission statements to heart and are able to make a real difference in the community. Latinx-owned or operated groups are exemplary examples of having these powerful statements and executing them, especially the Marietta Georgia's Theatre in The Square, as well as non-profits like Ser Familia and LCF Georgia. After digging into the mission statements from these Latinx-based groups, we discovered that despite the different outreach objectives these organizations have, they impact the community in the same way-- by establishing an art to leadership by bringing pride, strength, and positivity. We came to this conclusion after working with the Marietta Museum of History as a class to build their collection of the Latinx experience in Cobb County. Our group focused on questions like "What are the schools and educational experiences like for Cobb County Latinx immigrants?" and "What is the everyday life and pop culture experience of Latinx immigrants in Cobb County?" These organizations offer programs for all ages to take part in cultural events, educational opportunities, and volunteer work. The Marietta Theatre is a direct example of how art is used to display leadership through the performances and other community outreach opportunities. Ser Familia and LCF Georgia do not use art forms to display pride and the other core values. However, beauty and art are*



*evident in the ways one individual helps another. Art draws on emotion and through this, art is prevalent in leadership. The ways in which these organizations reach out into their community to help those in need display leadership and evict emotion from all those around. The art of leadership brings pride, strength, and positivity to the Latinx community as well as other community members.*

### ***Taste of Community: A Local Look at Latinx Cuisine***

Oral Presentation - [Join now.](#)

10:00am-10:15am

Undergraduate Student(s): Keith Baker, Nick Courtney, Ayana Gillespie, Anastasiya Petryshyn

Research Mentor(s): Rochelle Cox

*Our research group did a study concentrating on the food culture of the Latinx community in Cobb County, Georgia. Research of three different food sources such as supermercados, food establishments, and different cultural festivals, revealed that food portrays a sense of community, safety, and family within the local Latinx community. The first phase of our research began with questions we had about the Latinx community in general, categorizing them based on topics into framing questions, and deciding to narrow our research into the food category. We asked questions such as, "What are key cultural foods? Where can they be found? What is the bigger picture when it pertains to food representing the community as a whole? Why are these food sources critical to the community?" Our starting point was utilizing KSU archives and branching out of the sources we located there. We visited a Cobb County supermercado and found that it was more tailored to the specific cultural foods the community consumes as opposed to a general supermarket. In addition, the supermercado entailed home baked goods, merchandise for all age groups, a thrift shop, and a butcher shop. We also discovered local Latin restaurants as well as taco trucks whose mission was the bring a sense of community to Latinos in Cobb County. The Latinx community is underrepresented and does not have an extensive recorded history, therefore a part of our project was to record our findings, compile information, and help the Marietta Museum of History establish an archive for the Latinx community. Our research can also be a place where not only individuals from the Latinx descent can find information, but other groups can learn about the community as well. We hope our findings can aid future researchers and preserve the history of the Latinx people.*

### ***The Latinx ESL Crisis in Cobb County***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Mark Hite, Christian Simon, Garrett Parker, Mitzy Franco, Chris Nguyen, and Max Dixon

Research Mentor(s): Rochelle Harris Cox

*During our research for the Marietta Museum of History Project, we have found that ESL (English as a Second Language) programs in Cobb County lack funding, mobilization, and awareness. The growing*

language barrier caused by poorly implemented ESL programs hurts the academic performance of Latinx students. For this reason, it is imperative that ESL programs in Cobb receive more attention. We recommend prevalent community leaders use their influence and take initiative in advocating for this cause. We have already seen strong community involvement among local leaders, such as restaurant owner Juan Violantes, who runs Giovanni's Children Foundation, a nonprofit organization. We need more people like Violantes to be at the vanguard of a grassroots movement to support ESL programs in the county. Building a coalition of concerned families, educators, and business leaders is the best way to petition Cobb County School Board members and demand change. Creating an improvement in ESL programs in Cobb County starts with the families and community. It is only after they gain more support and knowledge of ESLs can we hope to get more funding from government resources. In partnership with the Marietta Museum of History, we are striving to document the history of the Latinx community of Cobb County that has gone unnoticed. Our research will be given to the museum for documentation in the hopes of better representation for the community. For our research process, we were given framing questions on education and country of origin to steer us towards our areas of research. We focused on sources that were able to have conversations with each other, ending with a strong lead toward ESL programs in Cobb County. Cobb has experienced massive growth in its Latinx school-age population since the turn of the century, making it more important than ever to have successful ESL programs.

### ***Sartre, Nietzsche, and Prufrock's Existential Becoming***

Oral Presentation - [Join now.](#)

9:30am-9:45am

Undergraduate Student(s): Luan Joubert

Research Mentor(s): Lara Smith-Sitton

In "The Love Song of J. Alfred Prufrock," Eliot refers to Prufrock's "overwhelming question" throughout the poem. Its repetition becomes the dubious center missing throughout the lines of the poem. This project is guided by a primary research question: how does an existential understanding of Prufrock help us navigate as well as track the progression of the romantic ideal that history is progress and the search for authenticity between two centuries, specifically the Nietzschean *Übermensch* and Sartre's existential authenticity? The existential reading reveals both the equivocal question and answer central to the poem itself: Prufrock's authenticity. The vein of technology proliferating the lives of individuals in today's world exacerbates the ignorance at the center of their lives due to this period's predilection towards unrestrained subjectivity. Social media and other digital spaces create an extension and permutation of the Nietzschean State ruled by pseudo culture that vies for power over the modern man as it did for Prufrock in his era, revealing the poem as a power struggle between becoming oneself through self-mastery as the *Übermensch* or falling victim to the power of the state and being subordinated to the "last man". Throughout the poem's meandering, Eliot reveals Prufrock's search for authenticity leading him to intersect with what Sartre termed "the look," bringing into discussion the concept of the Other. These themes inherent in the poem are evident in the twenty-first century when considering how technology presents another buffer between individuals and their authentic selves by way of rapid new conceptualizations.

## Geography and Anthropology

### ***An Archival Study of the Walnut Grove Plantation and the Young Family***

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Jennifer Billingsley

Research Mentor(s): Terry Powis

*The Walnut Grove Plantation is situated near the confluence of the Etowah River and Pettit Creek in Cartersville, an area rich with history. The history of Walnut Grove is far-reaching into the past, beginning in the 1800s with the arrival of the family of Robert Maxwell Young from Spartanburg, South Carolina. As a location for the Kennesaw State University Archaeology Field School taught by Dr. Terry Powis, some basic knowledge about the property and family has previously been compiled with a focus on the Civil War, the possible role of the Walnut Grove property during the war, and Pierce Manning Butler Young, a son of Robert M. Young, who was a Major General in the Confederate Army. Although we have some details pertaining to the Young family and Walnut Grove, there are still many gaps in the information such as when the property was purchased, why the Young's chose to move to Cartersville, the location of buildings that previously stood on the property, and how the property was passed down through the generations. This research seeks to find those missing pieces of information through letters, deeds, property maps, and factual documentation about the lives of the entire family and their home of Walnut Grove. This research seeks to use that information to bring to life the history of Robert M. and Caroline Young and their descendants through nearly 200 years, as well as their home of Walnut Grove that has been passed down through generations to their great- great-grandchildren today.*

### ***Duval County Gun Violence Incidents 2014 -2020***

Poster Presentation - [Join now.](#)

1:45pm-2:00pm

Undergraduate Student(s): Meghan Meier

Research Mentor(s): Uli Ingram

*Gun violence claims the lives of more than 30,000 individuals each year in the United States. In its most current data report investigating gun-related incidents, statistics from the CDC found three-quarters of these deaths were classified as murder by a firearm. Compared to the national level, Florida is identified as the 26<sup>th</sup> highest producer of gun violence in the country. Among its 67 counties, Duval County generates the leading rate of gun deaths, with the City of Jacksonville at its epicenter. The purpose of this study was to create a crime analysis package investigating the micro and macro level variables associated to gun violence crime that has produced fatalities in Duval County between 2014 and February 2020. The study also aimed to investigate zip code 32209, which has the most repeated shooting cases in Jacksonville each year. This poster was created as a project for GIS 4100. This directed applied research project is a collaboration between the Department of Geography and Anthropology and the Center for Sustainable Journalism. GIS analysis functions were implemented to identify the spatial*

*relationships between geography and gun violence trends. These methods included a Kernel Analysis, Multiple Ring Buffer Analysis, Choropleth Analysis, and Directional Distribution Analysis. Conclusively, the region that produced the majority of gun violence crime linked to fatalities was found in the Jacksonville West subdivision. The significance of this research confirms there are strong spatial correlation patterns that include poverty, police station proximity, and metropolitan infrastructure that influence the location where majority of gun violence takes place.*

### ***A Look into the History of Racial Diversity in the Congregation of the Cathedral of Christ the King***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Devlin McElrone

Research Mentor(s): Brandon D. Lundy

*This paper aims to assess the history of the Cathedral of Christ the King, a Catholic church in the Buckhead area of Atlanta, in terms of diversity. The main goal of this paper is to investigate the diversity of the church congregation in terms of race, while also focusing to a lesser extent on socioeconomic background and age. The area the church is in is primarily composed of upper-middle-class white families and it was through this observation that I came upon this topic. To investigate this issue, the first method used was spot sampling and constant monitoring of the congregation at two unique masses (an average Sunday mass and a Stations of the Cross mass). The church is laid out in quadrants of 15 rows each; I observed an entire quadrant by sitting in a pew across from my observed area and observed the two people closest to the aisle on every third row for five minutes each. The next method used was interviewing (n=8) regular parishioners and experts which consisted of priests, long-time volunteers, and associates. The people who consented to an interview were found using snowball sampling while using judgment sampling for specific people who were knowledgeable in areas relating to the study. The interviewees were interviewed in a structured fashion with two separate questionnaires: one made specifically for parishioners and another for experts. The KWIC method of thematic analysis was used to code the interviews which were done through NVIVO. Memoing was used to analyze observations taken.*

### ***The Material Wealth of Slaves in the South***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): India Daniel

Research Mentor(s): Terry Powis

*Since its beginning, enslavement of African peoples in the New World has been a topic of great interest. There are many different routes to go, in terms of researching that era and what went along with it. However, because of its extent and variation in different places, there is a great amount of information and stories that have gone untold. This research will help to unpack some of those stories, particularly as*

*it relates to the slaves of the Conner-Field house in Cartersville, Georgia, whose possessions were not typical “slave possessions”. Their possessions help to shed a light on their material wealth. Through exploring their material wealth, the dichotomy of the slaves will also be analyzed, in order to determine whether or not out-house slaves, for example, had the same access to acquiring such items as in-house slaves. This research will also explain the different reasons why the slaves living here might have had access to such items. The reasons could range from the slaves having a special/personal relationship with their owners, to the owners being more economically affluent compared to other slave-owning families. This gives insight as to how the slave-owning families’ personal lives impacted their slaves’ lives, making it important to also compare slave owners across different mediums (time, location, space, number of slaves) to ultimately determine the life of a slave in a given area. The commonality, or lack thereof, between different slave groups will further help to illustrate why they had or did not have certain privileges and/or benefits.*

### ***Cobb County: A Tapestry of Diversity***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Tim Willson

Research Mentor(s): Uli Ingram

*Named for former senator Thomas Cobb, Cobb County is a major Metro-Atlanta county. Situated north-west of Atlanta, and touched by 3 Interstates, it has become a place that many call home. With a population of 760K, it is the 3rd most populous county in Georgia. While working on a direct applied research project about Hispanic communities in Marietta for the Marietta Museum of History, I wanted to show how Cobb County’s population has become distinct yet diverse. More than just standard demographics, ESRI has developed a tapestry to describe America’s neighborhoods and broken them down into LifeMode Groups. Each LifeMode group is a reflection of their socioeconomic and demographic composition. Each Census Block shows the dominant LifeMode Group. While East Cobb and Vinings are known for their upscale and affluent neighborhoods, Marietta, Smyrna and Mableton is a diverse potpourri of families and singles, young and old. Cobb County’s placement makes it a special place for everyone, in all walks of life.*

### ***Kill Zones and Their Use During the American Civil War: An Archaeological Review of The Battle of Pickett’s Mill***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Jeremy Wolfe

Research Mentor(s): Terry Powis

*While not well known in the list of battles during the Atlanta Campaign late in the American Civil War, it is marked as an overwhelming Confederate victory in the face of looming defeat in the war itself. With the Union suffering nearly two thousand casualties, the tactics and strategies used by the*



*Confederate army no doubt aided in their victory. During the battle, Union soldiers were drawn into a ravine where Confederate soldiers could easily fire down on them. The Union men followed the ravine up into a flat area where they were then fired on again with accurate rifle and cannon fire. This research will review the areas of concentrated fire by Confederate troops and whether these occurred out of circumstance, or if they had been planned in advanced as pre-designated areas of fire, otherwise known as "kill zones". The archaeological data from previous research will be reviewed to determine concentrations of Confederate fired ammunition as well as lines of entrenchment to gather evidence of premeditated fields of fire to create a kill zone. This research will also review historical texts and accounts to determine if this was intentional and whether this strategy was used elsewhere in battles during the Civil War. It will also review that if these areas of concentrated fire were only by coincidence, then what were the mistakes made by the Union that lead to such a high number of casualties when they heavily outnumbered Confederate forces.*

### ***Hispanic Demographics in Cobb County***

Poster Presentation - [Join now.](#)

2:30pm-2:45pm

Undergraduate Student(s): Cole Thompson

Research Mentor(s): Dr. U Ingram

*This poster presentation is partnered with Dr. Ingram's GIS 4100 course. The poster will consist of various maps generated by geospatial software. These maps will display analysis done on the Hispanic Demographics in Cobb County. The geo-spatial programs utilized to create these maps include Arc Map 10.7 and ArcGIS Online. Attributes analyzed include population, income, language, and education. Specifically, I'm observing spatial patterns in the Hispanic community reflected by those attributes. Draft maps have been created and exhibit some interesting spatial patterns. Results have shown that the majority of Hispanics reside in zip-codes near Marietta. However, further analysis has shown that zip-codes following I-75 tend to have higher Hispanic populations. Another key trend is the growth of the Hispanic community in certain areas. Trends indicate that the Marietta region is experiencing higher rates of Hispanic growth than any other region. By using GIS to map out the Hispanic demographics of Cobb County, one can observe spatial patterns reflected by their community.*

### ***Understanding Map Reading with Eye Motion Tracking***

Poster Presentation - [Join now.](#)

2:45pm-3:00pm

Undergraduate Student(s): Luke Freiler

Research Mentor(s): Ulrike Ingram and Nancy Pullen

*Digital maps have become an integral part of people's daily lives, helping to convey numerous kinds of vital information. As the popularity of digital maps has increased, the ways that they are both created and understood have evolved. This project's goal is to analyze how people view and interpret digital maps and in turn gain a better understanding of how to create more impactful maps. Digital maps are*

*used differently from physical maps, and therefore require different approaches to their creation. Eye tracking hardware and software from Pupil Labs was used to record students while viewing a series of maps. This data was processed and projected within ArcGIS Pro to visualize where the users were looking on the map and when. A variety of visualization methods were used to present this data, including heatmaps and gaze position points that were colored differently depending on the timestamp from the recording. By analyzing this information, it is possible to determine what elements of a map viewers focus on the most and what elements may catch their attention quicker than others and what elements do not seem to gain much attention. This gives an overview of what parts of the map hold the most critical information or what parts are the most attractive visually. Analyzing this information allows for a stronger understanding of what a user looks for in a map and how they will view the information presented to them.*

### ***A Technological Analysis of Ancient Maya Shell Beads from Pacbitun, Belize***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Kimberly A. Kiddoo

Research Mentor(s): Terry Powis

*Ancient Maya had one of the most complex societies in the New World. Their society was driven by the production of goods, including items made from stone, bone and shell. to shell objects were made into various shapes including pendants, bracelets and beads, possibly used for jewelry or as currency. At Pacbitun, located in west central Belize, 1,000's of shell items in the form of beads have been found in and around homes that date to the Middle Preclassic period. Beads as well as marine detritus and chert drills have been found together indicating they were produced on site. This project focuses on the technology used to produce the shell beads to see if it can be reproduced to gain a better understanding about how the Maya were creating them. Experimental archaeology will be used to attempt to recreate the process to determine how they were producing the beads.*

### ***Haves versus Have Nots: Analyzing Swift Creek Ceramic Distribution within the Middle Woodland Etowah River Valley***

Poster Presentation - [Join now.](#)

3:15pm-3:30pm

Undergraduate Student(s): Isabella Rosinko and Morgan Bendzinski

Research Mentor(s): Terry Powis

*Swift Creek Culture refers to prehistoric Native American peoples of Florida and Georgia who produced a distinctive type of pottery, called Swift Creek Complicated Stamped, dating from 20 BC to AD 805. This Middle Woodland pottery type can be identified by curved geometric decorations stamped onto clay with a wooden paddle. Swift Creek Complicated Stamped pottery was widely traded across the Eastern Woodlands among high-status individuals and is therefore regarded as a prestige item. The preeminent Swift Creek site of the Etowah River Valley during the Middle Woodland is the Leake site. At the Leake site, there were three conical mounds and thousands of Swift Creek ceramics recovered. Its presence at*

*Leake implies social stratification within that community. A smaller site, known as Cummings, is located across the Etowah River, about 500 meters away. Decorated ceramic types found at Cummings included: Swift Creek Complicated Stamped, Dunlap Fabric Impressed, Cartersville Simple Stamped, Cartersville Checked Stamped, and Cartersville Linear Checked Stamped. During the 2018 excavation of six units at Cummings, a singular Swift Creek ceramic sherd was recovered. The low frequency of Swift Creek sherds at Cummings implies that the inhabitants at the site were not tied into Swift Creek Culture like those at the Leake site, which suggests their different (lower) status would not have allowed them access to this prestige ware. This research focuses on the nature and extent of the relationship between Leake and Cummings and how each were connected politically, socially, and economically to each other during the Middle Woodland period.*

### ***Exploring Introductions to Biological Anthropology Before College Using Textbook Content Analysis***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Undergraduate Student(s): Abby Hill

Research Mentor(s): Alice Gooding

*Many studies have been conducted examining how evolutionary theory is taught in K-12 and found a lack of material being presented to students because of religious reasons. However, the material within the textbooks was not analyzed, nor were the standards or curriculum. Cobb County public schools are not required to teach students about primates or paleoanthropology, most likely because the processes human evolution is heavily debated socially. Nevertheless, students are required to learn about population genetics and natural selection. For this study, sections about primates, human evolution, and microevolution were transcribed from five common high school science textbook. Language, photographs, and topics were assessed. Using NVivo software, sentences were organized using keywords as categories. Results show a distinct lack of information on primates and human evolution in the textbooks sampled. For example, only two out the five textbooks mention the word “prosimian,” and both of those books place tarsiers in the prosimian category, which is an out-of-date classification. Further, only three out of the five books mentioned paleoanthropology as the study of human ancestors. However, the microevolution sections followed the same formula for terms and definitions, and therefore were relatively the same in regard to the four components of microevolution: natural selection, gene flow, genetic drift, and mutation. Four of the textbooks were co-authored by the same person, and consequently had similar—if not identical—material. The results of this study demonstrate a concerning lack of knowledge about human evolution and primates prior to exposure in college. The author argue that these findings may be linked to the difficulty in introducing biological anthropology at the undergraduate level, primarily because the topic may be foreign to many students.*

### ***Geographic Study of Latinx Immigrant-Owned Markets in Cobb County, Georgia***

Poster Presentation - [Join now.](#)

3:45pm-4:00pm



Undergraduate Student(s): Brittney Brown  
Research Mentor(s): Paul McDaniel

*Immigrant-owned businesses allow for immigrants to establish themselves in a foreign country and can also provide a sense of community to other immigrants living in the same area. Immigrants tend to settle in areas where there are others of the same nationality and speak the same languages, because it provides immigrants with a social connection. Immigrant-owned businesses can be indicative of an ethnoburb, which is defined as a notable cluster of an ethnic minority population in a suburban context. With a focus on Latinx immigrant-owned markets in Cobb County, Georgia, this study aims to find the connection between Latinx immigrant-owned markets and ethnoburbs, the connection between Latinx immigrant market ownership and place of origin, and the disadvantages/advantages of Latinx business owners in Cobb County. The research questions include: Are Latinx markets representative of an ethnoburb in Cobb County? Is there a connection between Latinx market ownership and place of origin for Latinx residents in Cobb County? What are the advantages/disadvantages for Latinx business owners in Cobb County? The research methods for this study include analysis of quantitative secondary data from the Census Bureau, and analysis of secondary data about immigrant-owned businesses in Cobb County. The results of this study will allow for a broader understanding of Latinx businesses, and the Latinx community in Cobb County. Aggregate results and quantitative data analysis of census data about the Latinx population in Cobb County will also be of benefit to local institutions.*

### ***Student Loan Debt Impacts on Choosing a Field of Study***

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): Lance McGonigle  
Research Mentor(s): Brandon D. Lundy

*Student loan debt has been steadily rising over the last handful of decades, and many students who take these loans have little to no knowledge about the financial challenges that these loans can bring. This research is aimed to understand how student loan debt impacts a students' field of study choice during their time as a college student, or if this has any affect at all. In doing a qualitative, humanistic study; exploratory research was conducted using inductive reasoning along with the use of semi-structured interviews and online surveys to obtain data. These data collection techniques have been used in order to form a generalized result of the wide-ranging population of students at Kennesaw State University. All students of Kennesaw State University as well as the financial aid department make up the population of this study. The data suggests that many students rely solely on student loans to pay for all of their college expenses which encompass rent, books, tuition, university fees, and food, while a portion of other students have all of these expenses covered by a parent or other third party. Many of the students who do receive a student loan are left to their own devices to figure out how to accept these loans and access this money due to a lack of involvement with the financial aid office. Although materials are available to help this process, many students do not realize all of the resources that are available to them.*

*Consequently, student loan debt can provide an important perspective to understanding why some students change their field of study due to financial reasoning.*

### ***Assessing Map Reading and Map Design Using Eye Tracking Software***

Poster Presentation – [Join now.](#)

4:15pm-4:30pm

Undergraduate Student(s): Tammy Eifler, Luke Freiler

Research Mentor(s): Nancy Hoalst-Pullen, Uli Ingram

*The purpose of this research is to assist the faculty at Kennesaw State University (KSU) in restructuring the current Geographic Information Science (GIS) curriculum with regards to cartographic design and map reading skills. To do this, students in lower and upper level geography and GIS courses were asked to participate in a short exercise. After custom calibration of the Pupil Labs eye movement tracking glasses, each student is asked to view four different maps for 30-60 seconds each, and then follow up with a question to assess how they interpreted the map. The given maps range from cartographically poor to cartographically good. All eye movements are recorded and stored for later analysis. Data analysis by student geospatial skill level is then done by the research students. To visually interpret this data, heat maps are created using ESRI ArcGIS Pro software. These findings will answer three questions. First, how does eye-tracking show how students read maps? Second, how do students with differing levels of geospatial skills read digital maps? And Lastly, how does map design influence map reading? We anticipate the following results: 1. Eye tracking software will show trends when quantitatively aggregated results are visually mapped; 2. Students with more limited geospatial skills will have heat maps showing random reading patterns, especially with cartographically poor maps; and 3. Heat maps will show how cartography influences how a map is read.*

### ***Immigration and Food Security: Assessing Levels of Food Security Among Cabo Verdean Immigrant Households and Their Use of Public Food Assistance Programs***

Poster Presentation - [Join now.](#)

4:30pm-4:45pm

Undergraduate Student(s): Alexandria Seigler

Research Mentor(s): Brandon D. Lundy

*On February 24, 2020, the Department of Homeland Security implemented the new public charge rule, which impacts new immigrants to the United States. An immigration officer must decide whether the person applying for a green card or visa will become a “public charge,” meaning that they will likely become dependent on government benefits. This project is part of a Diplomacy Lab team of KSU faculty and students sponsored by the U.S. Department of State. We are researching the experiences of new Cabo Verdean immigrants to the United States. My specific research focuses on food security and the use of public food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP). My research question examines the level of food security in new Cabo Verdean immigrant households in the United States and how their level of food security affects their use of public food*

*assistance programs. Our team collected data to analyze Cabo Verdean immigrants' physical access to food as well as their economic access to food. Data collection methods included government assistance data, distributing online surveys and conducting semi-structured interviews. Findings will assist with understanding how reliant new Cabo Verdean immigrants are on government assistance programs and how this compares to other immigrant groups and the broader U.S. population.*

## **History and Philosophy**

### ***Empire, Autochthony, and Identity in Fifth Century Athens***

Oral Presentation

Not presenting

Undergraduate Student(s): Maegan Ferguson

Research Mentor(s): Brian Swain

*The fifth-century BCE is a period of Athenian history that is bookended by conflict. It began with the Persian Wars, which established Athens as a major power and gave them claim to their empire. The period ended with the Peloponnesian War, which resulted in the defeat of Athens and the end of their imperial reign. The fifth century was a period of unprecedented cultural, political, and ideological development, and is one of the most important periods in all of Greek history. Despite the various developments that occurred in the fifth-century, most of the scholarship on fifth-century Athens is concerned with the Athenian political system, demokratia. It is hard to find work on Athens that does not insinuate that the cultural flourishing and development in the fifth century was inherently a result or expression of democracy. However, when Athenians portrayed themselves in the abstract, democracy was not commonly evoked. Instead, it was their autochthony (ethnic purity), military power, and empire that both the Athenians and others most readily associated with Athens. The ancient cultural expressions that allegedly represent democracy cannot actually be directly connected to the institution, nor did Athenians in the fifth century say that they would be remembered because of their democracy. When we remove presentist ideas and accept what the sources explicitly say, it becomes clear that rather than their political system, the Athenians believed that it was their autochthony, military power, and empire that led to their successes and defined the identity of Athenians.*

### ***The Rome Courier's Crusade Against Cotton: The Use of Media in the Confederate Cotton Crisis***

Oral Presentation - [Join now.](#)

10:00am-10:15am

Undergraduate Student(s): Camilla Stegall

Research Mentor(s): Albert Way

*During the American Civil War, lack of access to the food crops of the North required the Confederacy to become self-sufficient. A battle ensued between the Confederate government and its citizens who desired food crops versus the cotton planters who desired to grow cotton crops for economic gain. While*

historians such as Stanley Lebergott and Lee W. Formwalt have investigated the military and home front consequences of this debate, no one has conducted a fine-grained analysis of a particular community, especially one outside of the major cotton growing districts. This research examines how the Confederate cotton crisis spread to Georgians beyond the traditional cotton belt in middle Georgia, specifically to Floyd County, and its county seat, Rome, in northwest Georgia. In addition, it demonstrates how the newspaper, the Rome Courier, provided both information and propaganda about the crisis to citizens in an attempt to promote food crop growth in the Rome area and to save them from starvation. This study begins with a review of the historiography on the effects of continued cotton growth in the Confederacy, covering the major works on this question to date. It then shifts into primary source research on cotton and food crop growth in Floyd County and Rome, Georgia, using the Rome Courier, which leads to an exploration of the role the Rome Courier itself played in the Confederate cotton crisis. This research provides insight into the variety of tactics, such as weather reports and wartime propaganda, used by Southern newspapers to influence readers to grow more food crops during the Confederate cotton crisis, even in an area removed from the middle Georgia cotton belt. Finally, this project concludes that, despite these appeals and tactics by the newspapers, other overriding factors led to struggle and starvation in places such as Rome.

## Psychology

### ***Attitudes Toward Immigrants and Immigration Issues***

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Kaelyn Ireland, Chris Causey, Fatma Aldihri, Margot Aldana, Marisol Mendez, Latifat Giwa

Research Mentor(s): Amy Buddie

*In recent years, immigration has become an increasingly important and hotly debated topic in the United States. Americans' attitudes toward immigrants vary considerably, from highly positive (e.g., immigrants contribute valuable outside perspectives to our country) to highly negative (e.g., immigrants are an economic burden and increase crime rates in our communities), and these views affect support for or dissent toward governmental policies (e.g., deportation of undocumented immigrants, construction of a physical barrier at the U.S.- Mexico border). Researchers in various fields have investigated why some people react negatively to immigrants, but there is less research exploring factors that correlate with positive or ambivalent attitudes. Our goal is to examine attitudes toward immigrants and immigration issues from psychological, political, and economic perspectives: Do U.S.-born citizens and immigrants differ in their knowledge, attitudes, and positive or negative associations with immigrants and immigration? We expect immigrants and children and grandchildren of immigrants will outperform U.S.-born citizens on the knowledge test. We also expect individuals with negative immigration attitudes will score lower on the knowledge test compared to those with positive attitudes. Consistent with previous research, we expect negative views toward immigrants will be positively correlated with conservatism and a strong American identity, and people with negative views*

*will respond more negatively to undocumented vs. documented immigrants. We predict positive views toward immigrants will be positively correlated with liberalism and a feeling of being a global citizen, and people with positive attitudes will not have significantly different attitudes toward documented and undocumented immigrants. Finally, we will examine participants' word associations with immigrants and whether they are generally positive, negative, ambivalent, or neutral. This study will help us understand how our campus community views immigrants, and more broadly, it will provide insight about some factors that may be associated with positivity toward immigrants.*

### ***Perceptions of Pet Relinquishment***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Lauren Mitchell

Research Mentor(s): Suma Mallavarapu, Allison Martin

*Each year, millions of dogs are surrendered to shelters in the United States (ASPCA, 2018). Varying factors such as aggression (Salman et al., 2000), lifestyle changes (Houpt, Honig, & Reisner, 1996), and destructive tendencies such as house soiling and chewing (Miller et al., 1996) seem to affect these decisions to relinquish. However, not much research has been conducted to understand how other people perceive relinquishment. In order to understand these perceptions, 443 undergraduate students at Kennesaw State University were surveyed and asked for their opinion on a variety of fictional circumstances which resulted in a dog owner surrendering their pet. Half of the participants were told that the owner had acquired the pet from a shelter; the other half were told that the owner had acquired the pet from a breeder. Within the breeder vs shelter condition each participant was given four reasons for relinquishment (relocation, excessive barking, aggression in the pet, and financial issues). Participants rated whether they felt the situation outcome was acceptable or unacceptable. A mixed analysis of variance showed that whether the dog was acquired from a shelter or a breeder had no effect on participant ratings [Pillai's Trace = 0.013,  $F(7, 435) = 0.789$ ,  $p = 0.597$ , partial  $h^2 = 0.013$ , power = 0.34]. The type of scenario had an effect on participant ratings [Pillai's Trace = 0.673,  $F(21, 421) = 41.195$ ,  $p < 0.001$ , partial  $h^2 = 0.673$ , power = 1.00]. There was no significant interaction between the condition (shelter vs. breeder) and the scenario [Pillai's Trace = 0.041,  $F(21, 421) = 0.850$ ,  $p = 0.656$ , partial  $h^2 = 0.04$ , power = 0.68]. The results from this survey are an important step in understanding underlying perceptions about dog relinquishment. Understanding these perceptions may help us identify ways to decrease relinquishment.*

### ***Perceived Susceptibility to Illness in Ethnic Minority Men***

Poster Presentation - [Join now.](#)

2:30pm-2:45pm

Undergraduate Student(s): Alleyna Alleyne, Audrey Campbell, Jessica Sprayberry, Brittney Washington

Research Mentor(s): Anisah Bagasra



*History would show that ethnic minority communities' health concerns often go unknown to the masses. Men in particular are a mystery to healthcare providers as well. Women are more likely to disclose information thus being more willing to participate in a study, let alone explore health concerns. Pair up being a male with being ethnic minority and you will have health topics that may not have been explored prior come to surface. The study is a community-based project with a purpose to acquire knowledge of men's beliefs about certain health concerns. Participation in the study are exclusive to ethnic minority men over the age of 18. Studies are currently being conducted in the metro Atlanta area. Although it is a very diverse area, challenges in data collection rise being that the study focuses on a skeptic population. Incomplete surveys, non-disclosure to demographics, and time have served as the source to these methodological challenges. Conclusions will include levels of agreement on statements about health issues as well as nonidentifiable demographic questions for analyzation. The anticipated results could lead to the overall betterment in representation for ethnic minority men in healthcare. Due to this study being an expansion of past research on this topic, expected results hold that men will be most concerned with getting diabetes and high blood pressure. Still, keeping in mind their perspectives on these health topics, new ways to raise awareness, educate, and treat could surface.*

### ***Attitudes Towards Recreational Drug Use: A Study of Kennesaw State University Students***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Mathew Fenner, Jack Arbuckle, Daron Pracharn, Aaron Murray, Katerina Joseph, Arely Cruz, Sierra Wynn, and Coby Shepherd

Research Mentor(s): Amy Buddie

*Illicit substance usage has always formed a substantial controversy in society, with various substances being used for such goals as the relief of stress, the enhancement of attention, and the attainment of peer approval (Agarwal, Loukas, & Perry, 2018; Lui, 2019; Maahs, Weidner, & Smith, 2016). The main focus of this study is on collegiate students' attitudes towards these drugs and the correlation of said attitudes with substance use. It has been found that college students react more positively to substance abuse treatment programs than their non-student counterparts. (Sahker, Acion, & Arndt, 2015) Therefore, it is essential to the success of these programs that they are equipped with the most accurate data concerning student usage of these drugs. In order to measure college students' attitudes, the Drug Attitudes Scale, or DAS, was employed alongside select questions from the Moral Disengagement in Doping scale (Goodstadt, Cook, Magid, & Gruson, 1978; Kavussanu, Hatzigeorgiadis, Elbe, & Ring, 2016). In addition to providing updated data on students' attitudes towards these drugs, usage of the modified DAS – coupled with the modified questions from the Moral Disengagement in Doping scale – could provide an updated, modern scale which can be used to measure these attitudes in a variety of contexts.*

### ***"Fake News," Political Polarization, and the Undermining of News Credibility***

Oral Presentation - [Join now.](#)

10:15am-10:30am

Undergraduate Student(s): Katie Coe, Nicholas Rousseau, and Madelyn Dorn  
Research Mentor(s): Pam Marek

*In our current political landscape, the term “fake news” has been weaponized by both major political parties to undermine the credibility of news that may support opposing political opinions. Media outlets have interacted with political polarization, tailoring their content to agree with consumers’ existing beliefs, and themselves have become increasingly polarized entities. CNN and Fox News have emerged as two of the most common targets for “fake news” accusations. With widespread misinformation playing a critical role in crises like the COVID-19 pandemic, we must examine whether growing distrust in media extends to non-political topics. To examine the effects of political attitudes and news network on perceived credibility of the presenting network and of the story itself, participants read identical news articles about an apolitical topic attributed to CNN or Fox News. Participants then rated how credible they perceived the news source and the story to be using the adapted Network Credibility and Story Credibility scales (Miller & Kurpius, 2010). They self-reported their political attitudes on a scale from very conservative to very liberal. The results indicate that some differences exist in credibility perceptions between self-reported liberals and those who identified as politically neutral for the network CNN and the associated story. Liberals in general also found CNN more credible than Fox, but the opposite was not true for conservatives. These results may be used to examine potential implications of the influence of political attitudes and news source branding on overall information dissemination and to better understand political polarization in America.*

### **Utility Value Interventions for First-Generation and Non-Traditional Students**

Poster Presentation - [Join now.](#)

10:30am-10:45am

Undergraduate Student(s): Crystal Rainwater, Emily Simmons

Research Mentor(s): Katherine White, Ordene Edwards

*Utility value interventions enhance interest and performance by asking students to focus on the academic and professional usefulness of coursework. Previous research demonstrates the efficacy of utility value interventions but it remains unclear how such interventions may affect first-generation and nontraditional students. In a longitudinal between-subjects quasi-experiment, data was analyzed from research involving students in Psychological Research Methods and Educational Psychology courses who were randomly assigned to complete either a utility value intervention or a control intervention on stress management. Data was collected on exam performance, reported course interest, and perceived utility value through online surveys, and generation status and tradition status were examined as potential moderating factors. It was hypothesized that because first-generation students would report lower levels of initial interest and generally exhibit poorer performance than continuing-generation students, they would demonstrate greater gains in these areas following the intervention. Conversely, it was hypothesized that nontraditional students would begin with higher scores than traditional students and therefore be less affected by the intervention. The results may illuminate moderating factors that impact the success of utility value interventions.*

### ***Impact of Human Presence and Visual Access on Barking Behavior in Shelter Dogs***

Poster Presentation - [Join now.](#)

11:45pm-12:00pm

Undergraduate Student(s): Emily W. Dowling, Jessie A. Catchpole, Christina M. Walthers, and Madison J. Pattillo

Research Mentor(s): Allison Martin

*Shelters can be stressful for dogs due to lack of predictability and control, social isolation, and busy environments. Providing dogs with more social opportunities and environmental predictability may improve their welfare. Barking may indicate stress and contribute to noise levels that are harmful to dogs and people. We investigated the impact of human presence and line of sight on barking. We manipulated line of sight by partially removing a crate barrier to allow the dogs visual access to other dogs and a better view of the room. We collected data on barking on 17 focal dogs as well as overall barking in the room during pre-treatment (no visual access), treatment (visual access), and post-treatment (no visual access) and noted if a person other than the observer was in the room. We found that in-room barking was significantly higher when a person was in the room (Wilcoxon Signed Ranks Test,  $Z = -4.048$ ,  $p < .001$ ). Based on these results, shelters should consider limiting the human activity in the room to reduce noise levels. Since barking did not significantly increase with the addition of visual access, shelters may also consider providing the dogs visual access as a way to allow beneficial social interaction.*

### ***A pilot study investigating adopted children's cultural identity from adopting parents' perspective***

Oral Presentation - [Join now.](#)

10:45am-11:00am

Undergraduate Student(s): Alyssa McVeigh

Research Mentor(s): Ginny Zhan

*Adopted children are faced with challenges of identity and a sense of belonging within their adopted family and environments. Research regarding adopted children suggests that their cultural identity is developed by the experiences they have within their biological culture such as, participating in holidays, meeting individuals who are from the same background or visiting their biological country. The goal of this pilot study was to explore the perspectives of adopting parents on their adopted children's cultural identity development, laying a foundation for the next study that will examine adopted children's (college students) perspective. Ten adopting parents from The United States were interviewed regarding their adopted child's experiences from birth until their current age. Interview questions were formulated based on previous research findings. Their answers were content analyzed, revealing three major themes: 1) the need for a child's biological parents' information to help the child adapt to the adoption, 2) the need for an adopted child to advocate for themselves, 3) special issues related to adopting a child with*



*past traumas, such as PTSD. Based on these themes discovered from this study, we plan to examine perspectives from adopted children themselves in the next study.*

### ***Implications of Visual Social Access on the Welfare and Behavior of Shelter Dogs***

Poster Presentation - [Join now.](#)

11:15am-11:30am

Undergraduate Student(s): Jessie Catchpole, Madison Pattillo, Lauren Mitchell, Christina Walthers, Lauren Faulkner

Research Mentor(s): Allison Martin

*Animal shelter environments have many stressful factors that impact the welfare of shelter dogs, such as lack of predictability and control, and social isolation. Social isolation has been found to increase abnormal behavior and lead to poorer adoption outcomes. Providing visual access to shelter dogs is a relatively easy environmental modification that increases social opportunities and allows for more predictability and control over the environment, potentially improving welfare. To investigate the impact of visual access on the behavior of dogs, we used a within-subject design, conducting 5-min focal observations four times weekly before, during, and after visual access was provided by partially removing a barrier between crates at a suburban dog shelter. Our preliminary analysis of 17 subjects using non-parametric Friedman's Tests ( $\alpha = .05$ ) found no significant difference between phases in regard to anxiety behaviors ( $\chi^2 (2) = .50, p = .78$ ), frustration behaviors ( $\chi^2 (2) = .51, p = .77$ ), time spent in the front of the crate ( $\chi^2 (2) = 4.50, p = .11$ ), self-directed behaviors ( $\chi^2 (2) = 1.86, p = .40$ ), resting behaviors ( $\chi^2 (2) = 4.59, p = .10$ ), or vocalizations ( $\chi^2 (2) = 4.59, p = .10$ ). The absence of an increase in vocalizations during visual access may encourage shelters to implement this change. However, the lack of a decrease in anxiety or frustration behaviors may indicate that visual access alone is insufficient for providing welfare benefits and that shelters should prioritize increasing social contact in dogs through playgroups or group housing.*

### ***Effects of Essential Oils on Shelter Dog Behavior***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Undergraduate Student(s): Madison Pattillo, Jessie Catchpole, and Lauren Mitchell

Research Mentor(s): Allison Martin

*Shelter environments are stressful for dogs due to loud noises and unfamiliar surroundings. Dogs rely heavily on scent information, and exposure to some scents has shown reductions in activity and vocalizations in shelter dogs. We investigated the effects of two calming (lavender and vetiver) and two stimulating (lemon and rosemary) essential oils on crate position and active, resting, and stress behaviors. Observations were conducted for 5-min intervals eight times per week, with observations split between baseline and scent exposure. Our preliminary analysis using the Wilcoxon Signed-Rank test found that dogs exposed to lavender ( $n = 13$ ), lemon ( $n = 9$ ), rosemary ( $n = 9$ ), and vetiver ( $n = 12$ ) did not show a significant difference in crate position, stress behavior, or resting behavior. However,*

*active behaviors decreased during exposure to rosemary (Wilcoxon Statistic = 19.5,  $p = 0.02$ ) as compared to baseline. There was no significant change in active behaviors with the other scents. The lack of a difference in the dog's behavior while exposed to the essential oils may indicate that scent enrichment may not be enough to have significant calming effects on the dogs, but it did not have any apparent negative effects on the dog's behaviors.*

### ***Do Students' Beliefs about Gender Relate to their Performance in a Gender Course?***

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): Steven Peek

Research Mentor(s): Jennifer Willard

*Given the increase in awareness concerning diversity in the United States, it is important to understand how diversity-related beliefs relate to students' performance in an academic setting. Previous researchers have found that student beliefs concerning diversity are primarily focused on race and culture (Littleford, 2013). This may be changing as movements like #MeToo raise awareness of gender-related issues, which may increase the relevance of courses like Psychology of Gender. However, students' prior beliefs may impact how they navigate and perform in gender-related classes. The goal of the current study was to determine whether there were significant relationships between different types of gendered beliefs (i.e. gender roles, rape myths, sexism, and feminism) and students' academic performance in an undergraduate-level Psychology of Gender course. Twenty-nine students in two online sections of Psychology of Gender completed measures related to gender, along with three exams. Correlational analyses indicated that only some subscales of sexism and feminism were significantly related to average exam performance. Overall, our results generally demonstrate that prior beliefs were largely unrelated to performance; thus, suggesting that most students regardless of beliefs have a similar chance of succeeding in the course.*

### ***What's This GroupMe Thing? Instructor Perceptions and Experiences***

Poster Presentation - [Join now.](#)

4:15pm-4:30pm

Undergraduate Student(s): Naomi Katz and Mary Jones

Research Mentor(s): Jennifer Willard and Adrienne Williamson

*Many current college students have never known a world without the ability to instantly share information. GroupMe is an instant messaging app that facilitates group messaging, and its presence on college campuses has only recently been noted (Carpenter & Green, 2017). However, students routinely create GroupMe conversations for their classes and invite their classmates to join. Often these conversations are unmonitored. Discussions with a college Academic Integrity Office suggest that there are concerns regarding student activity in class GroupMe conversations, particularly with regards to the potential to cheat. However, the degree to which faculty are aware, have experienced, or have developed policies related to students' use of GroupMe is unknown. The purpose of this research is to*

*investigate instructors' awareness, perceptions, and experiences with students' class GroupMe use by surveying current faculty. Although this research is largely exploratory, we do expect newer faculty and faculty who are more technology savvy to have greater awareness and experience with students' use of the app. Understanding instructors' experiences with students' GroupMe activity may provide important information about the extent to which institutions should have concerns about academic integrity related to GroupMe use and how instructors might best respond to those concerns.*

### ***Preventative Actions Students Take in Understanding Their Future Health Behaviors***

Poster Presentation - [Join now.](#)

1:45pm-2:00pm

Undergraduate Student(s): Brooke V. Bentley; Ana Lodhi, Courtney Faro, Ryan Allen, Sefina Haque, and Destiny Dixon

Research Mentor(s): Amy Buddie

*Previous research has shown a lack of responsibility among college students when comparing student behaviors with the risk of health problems they can develop in the future (Baldwin, Towler, Oliver, & Datta, 2017). The purpose of this research is to determine whether students actively make decisions toward the betterment of their health and whether they understand the future health ramifications of their current behaviors. In addition, the research presented will bring student insight towards campus resources available to them. Questions, via online survey, will be proposed to students at Kennesaw State University pertaining to health topics with the goal of providing college students with a list of resources to improve their overall health. At the end of the survey there will be a debriefing with resources pertaining to drug-related concerns, as well as psychological and health services. The questions in the survey will focus on various lifestyle topics such as alcohol consumption, drug usage/misuse, exercise, nutrition, mental health, doctor appointments, supplements, and hygiene. We anticipate that there will be a majority of students who neglect their current health and do not consider how their actions will affect their future. This information could help us educate the students at the university about the different resources available on campus to help them stay on track for a healthier future.*

### ***Wrongful Convictions and False Confessions: An Analysis of Exoneration Cases***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Graduate Student(s): Alex Goldstein, Amber Goden

Undergraduate Student(s): Dana Bowen

Research Mentor(s): Jennifer Willard

*False confessions are a contributing factor to wrongful convictions. In this study, data from the National Registry of Exonerations was used to examine patterns in false confession cases, including the presence of co-contributing factors such as perjury, the presence of police-related situational factors, exoneree individual difference factors, and non-police related factors. Results suggest false confessions*

*are just one of several factors that can lead to false imprisonment. Factors that contribute to false confessions appear to be consistent with prior research. Comparisons of juveniles and adults also reveal patterns that may offer a better understanding which factors co-occur.*

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

Oral Presentation - [Join now.](#)

11:30am-11:45am

Undergraduate Student(s): Andrew Manocchio, Ronit Barman, Chase Redd

Research Mentor(s): Jennifer Willard

*The rise of online classrooms has brought forth new concerns about academic integrity that may not have been present in traditional brick-and-mortar classrooms. Emerging social technology, such as GroupMe, an app used to facilitate group text-messaging, has added a new dimension to academic integrity concerns. However, almost no research has been conducted examining how this technology impacts student behavior in the classroom. The current study investigates the degree to which students perceive various GroupMe conversations as including violations of academic integrity. Participants will be randomly assigned to read one of six GroupMe conversations in a 2 (type of cheating: meeting to collaborate on an online assessment vs. sharing answers to an online assessment) x 3 (obviousness of cheating: no cheating, ambiguous, vs. blatant) between-subjects design. After reading the GroupMe conversation, participants' perceptions of the extent to which the conversation is considered cheating and how they predict they would respond to the presented situation will be assessed. Participants' personality, perfectionism, and characteristics (e.g. age, race, gender, GPA, academic concentration) will also be assessed. It is predicted that participants reading the ambiguous conversion will produce both a higher degree of uncertainty in perceptions of cheating and a higher degree of non-reactive responses (e.g., remaining in but not interacting with peers in the group chat) than participants reading the blatant conversations. Additionally, we expect that participants' conscientiousness and GPA will be positively associated with their willingness to either remove themselves from a chat or report an instance of cheating. We plan to test our hypotheses via correlational analyses, analyses of variance, and regression. This study may provide insight into how students perceive instances of cheating in GroupMe, the circumstances in which GroupMe may become a catalyst for cheating, and the characteristics of students who may be involved in GroupMe cheating.*

### ***KSU Student Anxiety around Mass Shootings***

Oral Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Patrick Kielly, Chris Gold, Angel Jaimes, Madison Wilcox, Zach Peagler, Camari Stanley, Bailey Germain, Philip Williams-Jones, Nick Cotter

Research Mentor(s): Amy Buddie

*This research will examine the relationships among generalized anxiety, social anxiety, and fear of mass shootings, particularly for members of minority and low socioeconomic status (SES) groups. Previous research has examined the various types of mass public shootings and which ones receive more media attention. Previous research has also examined potential causes of mass shootings, ways to prevent them, and areas where mass shootings are common. There is little research on different types of anxiety (generalized and social) and how those correlate to fear of mass shootings, especially for minority groups in college. To examine this relationship, we will administer an online questionnaire with demographic questions, questions that examine generalized and social anxiety levels, and questions on fears of mass shootings on campus and off campus. We hypothesize that stronger correlations among generalized anxiety, social anxiety, and fear of mass shootings will emerge amongst participants who belong to minority groups rather than majority groups. Through this research we hope to find trends in anxiety levels amongst these student groups and use the findings to implement effective intervention programs at KSU. The purpose of this study is ultimately to ease anxiety levels among all students, especially those of minority status. This research will examine the relationships among generalized anxiety, social anxiety, and fear of mass shootings, particularly for members of minority and low socioeconomic status (SES) groups. Previous research has examined the various types of mass public shootings and which ones receive more media attention. Previous research has also examined potential causes of mass shootings, ways to prevent them, and areas where mass shootings are common. There is little research on different types of anxiety (generalized and social) and how those correlate to fear of mass shootings, especially for minority groups in college. To examine this relationship, we will administer an online questionnaire with demographic questions, questions that examine generalized and social anxiety levels, and questions on fears of mass shootings on campus and off campus. We hypothesize that stronger correlations among generalized anxiety, social anxiety, and fear of mass shootings will emerge amongst participants who belong to minority groups rather than majority groups. Through this research we hope to find trends in anxiety levels amongst these student groups and use the findings to implement effective intervention programs at KSU. The purpose of this study is ultimately to ease anxiety levels among all students, especially those of minority status.*

## **Sociology and Criminal Justice**

### ***Once Upon an American Dream: What the American Dream Means to Different People***

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Robbie Cronin, Amanda Silverman, Ruth Nwefo, Allison Riggins

Research Mentor(s): Amy Buddie

*One of the most prominent ethos of the United States of America is that of the "American Dream." While James Truslow Adams was the person to coin the term "American Dream," the concept dates back to the Declaration of Independence, which states that all men have the right to "life, liberty, and the pursuit of happiness." While the "American Dream" can be thought of as a single concrete goal, Štiuliuc argues, however, that "it constitutes a cultural narrative with manifold implications in the*



*multiple and distinct immigrant stories that created America" (2011:364). In order to determine the validity of this statement, a study will be distributed online asking participants to define their version of the American Dream. In order to accomplish this task, the survey will be broken into two main sections. The first will contain demographic questions that will be the basis for our analysis (age, race, religion, etc.) while the second will contain questions pertaining to goals that are a part of the "American Dream" (e.g., desired homeownership, desired income, desired marital status, etc.). We predict that those from a higher socioeconomic background will be more ambitious with their ideal "American Dream" than those with poorer economic backgrounds. We also predict that younger individuals will be more ambitious/optimistic with regard to their "American Dream" than older individuals. The results of this study will add to the literature regarding the extent to which different groups of people endorse aspects of the American Dream.*

### **Women's Sexual Health in Georgia: Teenage Pregnancy, Sex Education, and the New Fetal Heartbeat Law**

Oral Presentation - [Join now.](#)

9:30am-9:45am

Undergraduate Student(s): Laura Brockmann, Callie Bernstein, and Kiara Graves

Research Mentor(s): Darina Lepadatu

*Earlier this year, Georgia Governor Brian Kemp signed into effect one of the most restrictive abortion laws in the nation known as the Fetal Heartbeat Law. It restricts abortions after six weeks of pregnancy with exclusions including endangering the mother's life and reported rape or incest. This law is highly controversial and will drastically impact reproductive health, including pregnancy and maternal and infant deaths. Between the years of 1985 and 1992, the birth rate to teens in Georgia increased over 40%, causing Georgia to have one of the highest percentages of teen pregnancy in the country despite decreasing teen pregnancy rates within the U.S. overall. According to the CDC, Georgia also has one of the highest maternal mortality rates in the country. There were 43 deaths that were related to pregnancy in Georgia in 2014 and a large racial disparity among maternal deaths. During this controversial time, we researched women's health opinions on a variety of topics with a strong focus on the new abortion law. The purpose of our project is to explore the most critical aspects of women's health in Georgia, more specifically how teen pregnancies, women's mortality rates, infant mortality rates and the new Heartbeat Law affect women's health in Georgia. We surveyed 204 adult women living in Georgia about health issues such as sexual education in schools, preferred methods of contraception, attitudes towards teen pregnancy, and attitudes towards the new Fetal Heartbeat Law. As social scientists, we looked for statistically significant correlations between preferred methods of contraception and attitude towards the Fetal Heartbeat Law and different demographic information such as political affiliation, age, marital status, religion, and race. This research is necessary because it provides women's opinions on legislation that was signed into effect by a man about significant women's health issues.*

### **Involuntary Celibate: Creating a Coding System for Incels Online**

Oral Presentation - [Join now.](#)



10:00am-10:15am

Undergraduate Student(s): Zachary Hinds

Research Mentor(s): Daniel Farr

*“Involuntary Celibate” or “incel” has become an increasingly prevalent term used to describe an internet subculture primarily consisting of heterosexual men that is often a source of intense misogyny. “Incels” are but one of many men-focused internet subcultures and as these communities continue to grow, more research is needed to understand these communities. The purpose of this study was to investigate and code the language and behaviors of particular users who post on the most popular “incel” forum incels.co, especially as it pertains to the connection between homophobia and misogyny. This research was informed by prior research on male-focused online communities and the relationships between masculine homophobia and misogyny. Data for this study consisted of individual forum posts with responses pulled randomly from those posted to incels.co from January 1, 2020, to January 7, 2020. From these individual posts, comments, usernames, avatars, and linked images were analyzed to inform the coding. This coding system will allow for further in-depth research into both “incel” communities and may further inform research on male-focused online communities as it relates to misogyny.*

### **Promoting Exercise and Physical Activity among High-Risk Vulnerable Populations**

Poster Presentation - [Join now.](#)

4:15pm – 4:30pm

Undergraduate Student(s): Harshada Dani

Research Mentor(s): Evelina Sterling

*The goal of this study is to increase our understanding of how health promotion involving exercise and physical activity is influenced by race/ethnicity, gender, culture, socio-economic status, geography among vulnerable populations. Health promotion and disease prevention involves a cluster of behaviors, processes, contexts, and relationships among the “self”, providers, health care system, family, and community increasing participant self-efficacy to make a change. Despite much research in health promotion, critical gaps in knowledge still exist, especially regarding vulnerable and underserved populations. More specifically, low-income African American men represent a particularly vulnerable group, often experiencing significant health inequalities, risk factors and multiple chronic conditions, including hypertension, hyper-cholesterolemia, diabetes, HIV, and mental illness. This population often experiences added difficulties carrying out health protective behaviors, in part due to cultural beliefs and practices, knowledge and perceptions regarding health and illness, and lack of networks to support ongoing engagement in prescribed care. These challenges contribute to further disparities in risk factors and ultimately disability and death. An improved understanding of the relative and combined influences of important psychosocial factors is essential for the design of policies and programs that improve the health and encourage behavior change among low-income and minority Americans is needed. In this study, we conducted focus groups with low-income African American men, their family members, and healthcare providers to describe lived experiences and identify opportunities and challenges regarding exercise and physical activity as well as key elements influencing participation and engagement. This*

*study addresses the complexity of health promotion to achieve clinically important outcomes such as minimizing disability, optimizing function, and living well among all patients. This formative work improves our understanding of health promotion targeting low-income African American men. Moreover, we demonstrate the feasibility of recruiting for and implementing a more culturally relevant intervention with a vulnerable and often hard-to-engage population.*

***Make Your Wishes Known: Understanding the Challenges and Barriers for Providing Effective Ethics Consults to Low-Income African American Men***

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): Ruth Nwefo

Research Mentor(s): Evelina Sterling

*The distrust of the U.S. health care system is prevalent, especially within the African American (AA) community. This distrust is largely based on infamous cases such as the Tuskegee Syphilis Experiment and experiments conducted by James Marion Sims on slave women without anesthesia. While these experiments along with many others further advanced medicine, they severed trust between health care institutions and the African American community, bringing upon repercussions still felt today. Although many steps have been taken to rebuild trust in the health care system by establishing effective ethical guidelines, more needs to be done in terms of rebuilding the relationship. The purpose of this study is to attain a deeper understanding of the ethical mistrust in healthcare between the AA community and health care providers as well as how to bridge this gap. To further investigate this topic, KSU has partnered with WellStar Health Systems to collect qualitative data on the challenges and barriers for providing effective ethics consults specifically to low-income AA men where the intersections of race, gender and class are especially relevant. WellStar Health System has a robust ethics service providing consults upon request or referral, including informed consent, clinical trials/medical research, and advance directives. Unfortunately, these services are severely underutilized by the AA population. This research project includes conducting six focus groups including low-income AA men, their families/caretakers, and their health care providers. Focus groups will be tape-recorded, transcribed and analyzed using modified grounded theory methods. Expected results include details from this population pertaining to defining ethics, knowledge and attitudes toward key clinical ethical issues, and suggestions about how best to educate low-income AA men about making their wishes known about their healthcare choices. WellStar Health System expects to incorporate these data into their ethics program and educational initiatives for both patients and clinicians.*

**College of Science and Mathematics**

**Chemistry and Biochemistry**

***Synthesis of tert-Butyl(5-(2-iodoethyl)-2-methoxyphenoxy)dimethylsilane; a Side Chain Precursor that is Required for the Total Synthesis of the Hancock Alkaloid, Galipeine***

Poster Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Ahnaf Ahmed

Graduate Student(s): Zane Bertoli

Research Mentor(s): Christopher W. Alexander

*Tetrahydroquinolines (THQs) are a group biologically active of N-heterocyclic molecules derived from natural sources that have served as the basis for a variety of anti-bacterial, anti-parasitic, and anti-viral drugs. The 1,2,3,4-tetrahydroquinoline alkaloids, (Hancock alkaloids), Angustureine, Cuspareine, Galipeine and Galipinine, isolated from the bark of the Angostura tree found in Venezuela, have demonstrated anti-malaria activity, analgesic properties, and a range of enzyme inhibitory activity. This poster presents the results to synthesize tert-butyl(5-(2-iodoethyl)-2-methoxyphenoxy)dimethylsilane (tBIMDS) from 2-(4-hydroxyphenyl) ethanol (tyrosol). tBIMDS is a non-commercially available starting material that will be coupled with the alpha-amino-cycloalkylcuprate of N-tert-butyl-1-(3,4-dihydroquinolin-1(2H)-yl)methanimine as the key reaction step in our planned total synthesis of Galipeine.*

***Crystallography of Inhibitor Vertebrate Lysozyme (IVY)***

Oral Presentation - [Join now.](#)

9:30am-9:45am

Undergraduate Student(s): Jenny Wong

Research Mentor(s): Thomas Leeper

*Cryocrystallography of macromolecules features a high-resolution structure of individual atoms forming a nonsystematic lattice with internal dimensions interpreted by the diffraction of X-rays. By achieving the optimal conditions for crystal growth, a slow and controlled precipitation from the solvent creates a supersaturated environment to generate spontaneous nucleation of crystals. For this project, we are specifically targeting the protein structure of inhibitor vertebrate lysozyme (IVY) produced by *Pseudomonas aeruginosa* (PA). PA is an opportunistic pathogen that invades the host system during the latter stages of cystic fibrosis patients due to the weakened state of their immune system from earlier bacterial infections. PA is a virulent organism contributed from their ability to form biofilm which characterizes antibiotic resistance and protection against the lysing of the peptidoglycan cell walls by lysozyme. To combat PA, novel drug fragments are being created to inhibit the activity of IVY as well as a 'warhead' to bind to the active site H62 of the biofilm-producing enzyme. Early experiments utilizing crystal soaking of IVY and the 'warhead' in the mother liquor yielded rod clusters whereas the method of co-crystallization grew pronounced rod crystals. As a result, crystal growth of IVY and the combined ligand 'warhead' compound has been achieved with future experiments surrounding the optimization of conditions to produce harvestable crystals ideal for x-ray imaging. Hence, this method will help to determine the overall binding affinity of the drug fragments and 'warhead' with IVY as well as future*

*advances for mapping out the electron density of the crystal structure in order to support the idea that IVY and the 'warhead' have indeed bound together. If so, the ligand will inhibit IVY from biofilm formation, and without this barrier, PA will be less resistant to antibiotics which ultimately allows the lysozyme to come in and attack the pathogenic bacteria.*

### ***Investigating Cathode Dissolution by Homogenous Sol-Gel Coating on Manganese Dioxide Nanofibers to Extend Battery Performance***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Milan Haddad

Research Mentor(s): Altug Poyraz

*The cathode dissolution is a known phenomenon for manganese dioxide (MnO<sub>2</sub>) based cathode materials in both aqueous and non-aqueous batteries. Upon battery discharge, reduced Mn<sup>3+</sup> species disproportionate ( $2\text{Mn}^{3+} \rightarrow \text{Mn}^{4+} + \text{Mn}^{2+}$ ) and Mn<sup>2+</sup> dissolves into the electrolyte causing the loss of active material. While MnO<sub>2</sub> is a promising cathode for rechargeable aqueous zinc ion batteries (ZIB) due to its availability and low toxicity, the electrochemical performance is limited during battery cycling due to the dissolution of the cathode. In this work, a homogeneous sol-gel SiO<sub>2</sub> coatings with various thicknesses on hydrothermally synthesized  $\alpha$ -MnO<sub>2</sub> nanorods are reported. In-depth characterization of SiO<sub>2</sub> coated  $\alpha$ -MnO<sub>2</sub> are done by X-ray diffraction spectroscopy, Brunauer-Emmett-Teller surface area analysis, X-ray photon spectroscopy, thermogravimetric analysis and scanning and transmission electron microscopy to analyze the surface of the silica coated  $\alpha$ -MnO<sub>2</sub> cathodes. The electrochemical performance of the SiO<sub>2</sub> coated  $\alpha$ -MnO<sub>2</sub> cathodes are studied in two electrode zinc batteries at room temperatures using a Zn metal anode and in 2 M ZnSO<sub>4</sub> and 1 M TFSI electrolytes. The cathode dissolution is investigated by determining the total dissolved Mn content by inductively coupled plasma spectroscopy and characterization of the cycled electrodes by X-ray diffraction spectroscopy. Electrochemical performances of SiO<sub>2</sub> coated  $\alpha$ -MnO<sub>2</sub> are evaluated using cyclic voltammetry, electrochemical impedance spectroscopy, and Galvanostatic cycling tests. This study will further benefit all different battery types that have the same cathode dissolution problem.*

### ***Development of an antibiotic treatment for Pseudomonas aeruginosa utilizing metal complexes***

Oral Presentation - [Join now.](#)

2:30pm-2:45pm

Undergraduate Student(s): Preston Eldridge

Research Mentor(s): Thomas Leeper

*The purpose of my research is to develop antibiotics targeting Pseudomonas aeruginosa, which is responsible for deaths in patients with cystic fibrosis. One of the main difficulties with treatment is that P. aeruginosa produces a biofilm under anaerobic conditions. I am working with a protein called Molybdate Binding Protein (ModA) that binds to molybdate extracellularly and brings it into the cell*

for use in the nitrogen reduction process, a crucial step in anaerobic metabolism. If ModA is disabled the entire anaerobic metabolism fails, forcing the bacterium to operate aerobically where the biofilm growth is unfavorable. I am synthesizing a small molecule “warhead” that is similar enough to molybdate to still bind to the ModA active site but will have organic group(s) attached that can be linked to “fragments.” Fragments are small organic molecules that bind near the active site and when fused to a warhead will encourage it to irreversibly inactivate the protein. This inactivation is expected to force the cell back to aerobic metabolism and eliminate biofilm production. Two model warheads have been synthesized and their optimization is ongoing. The molecule warheads themselves also exhibit interesting chemistry, such as forming what appears to be a polymer under aqueous synthesis conditions, which I would like to investigate further to determine if it contains any useful properties. Subsequent to optimizing the warhead synthesis reaction and purification of ModA, I will test the molecules for binding affinity to ModA via multidimensional NMR and luminescence assays. The warhead will be synthetically combined with fragment hits obtained also by NMR, and NMR and crystallography will be used to verify the binding of the chimeric drug candidate to ModA. If successful, this chimeric fragment-warhead molecule will reduce biofilm formation and synergize with existing antibiotic therapies in the treatment of cystic fibrosis lung infections.

### ***Probing structure and energetics of proton-bound complexes $N_2...HCO^+$ and $N_2H^+...OC$ using computational chemistry methods***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Graduate Student(s): Dalton Boutwell

Undergraduate Student(s): Antonio Barrios, Onyi Okere, Monique Olocha, Oluwaseun Omodemi, Alexander Toledo

Research Mentor(s): Martina Kaledin

$N_2...HCO^+$  and  $N_2H^+...OC$  are predicted to exist in interstellar clouds. These complexes involve  $HCO^+$  and  $N_2H^+$  fragments that are bound to  $N_2$  and  $CO$ , respectively using hydrogen-bonded interaction. The reason these molecules are important is that the existence of nitrogen can be measured indirectly through ion-molecular complexes studied in this work. The measured vibrational spectra of molecules are an excellent way to characterize and detect molecules. We used B3LYP, MP2, and CCSD(T) computational methods to predict the structure and vibrational frequencies of  $N_2...HCO^+$  and  $N_2H^+...OC$  and their fragments. The aug-cc-pVDZ and aug-cc-pVTZ basis sets were used. The stability of the complexes was described in terms of dissociation energies  $D_e$  and their zero-point energy (ZPE) corrected values,  $D_0$ . Both molecular complexes exhibit a linear geometry. Vibrational frequencies were obtained using normal mode analysis. The  $N_2H^+...OC$  proton transfer vibrations occur at around 1800 – 1900  $cm^{-1}$ .  $H^+$  bound within  $HCO^+$  exhibit C-H vibration at ~2500-2700  $cm^{-1}$ . The  $N_2...HCO^+$  complex is more stable than  $N_2H^+...OC$  by ~7000  $cm^{-1}$ . The ZPE corrected values for dissociation energies,  $D_0$  for  $N_2...HCO^+ \rightarrow N_2 + HCO^+$  and  $N_2H^+...OC \rightarrow N_2H^+ + OC$  are ~3500  $cm^{-1}$  and ~5000  $cm^{-1}$ , respectively.



### ***Theoretical Study on the Isomerization and Detection of $N_2H^+ \dots OC$ Complex in Interstellar Clouds***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Graduate Student(s): Dalton Boutwell

Research Mentor(s): Martina Kaledin

*In this study, we characterize  $N_2H^+ \dots OC$  linear complex using Driven Molecular Dynamics (DMD) and Vibrational Self-Consistent Field Theory (VSCF) methods due to its relevance in astrochemistry. A central challenge is the detection of the molecular complex in interstellar media (ISM). Computational chemistry approaches can predict vibrational spectra, hence facilitate prediction of its existence and stability in the ISM.  $N_2H^+ \dots OC$  involves the proton transfer process via hydrogen bonding interaction. Proton motion is highly anharmonic, therefore facing a significant challenge to characterize it accurately. Quantum mechanical variational methods are popular among many theoretical chemists for their efficiency producing accurate results. DMD simulations present an alternative route to predicting and assignment of infrared spectra. The  $N_2H^+ \dots OC$  complex, is an important intermediate in the isomerization of  $COH^+$  to  $HCO^+$ , with no published experimental results. We test the accuracy and performance of the MP2/aug-cc-pVDZ and CCSD(T) levels of theory by comparing theoretical and available experimental spectra for similar complex  $N_4H^+$ . We report strong evidence of a metastable alternative, distorted T-shaped structure along the isomerization pathway of  $N_2H^+ \dots OC$ , that has never been reported before. Molecular vibration involving proton transfer along the molecular axis appears at  $\sim 1780\text{ cm}^{-1}$  predicted by both VSCF and DMD methods. This work provides an overview of IR spectra, line positions and mode assignment that allows an experimentalist to quickly detect molecules. With limited published theoretical results and no direct experiment, the  $N_2H^+ \dots OC$  complex remains an important target for theoretical and experimental chemists.*

### ***Inhibition of Glutathione Peroxidase***

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): Tosin Masha

Graduate Student(s): Madison Jaames

Research Mentor(s): Carol Chrestensen, Daniela Tapu, Meleye Mel

*Glutathione peroxidase (GPx) is an intracellular antioxidant enzyme that mediates the amount of hydrogen peroxide present in cells. Through this activity, GPx aids in the regulation of cellular processes that use hydrogen peroxide, including growth and proliferation. It may be desirable to inhibit GPx in certain diseased states, e.g. cancer, where GPx is over expressed. The Tapu lab is making N-heterocyclic compounds that have shown efficiency inhibiting thioredoxin reductase, which is another selenocysteine containing enzyme. Our aim is to test similar compounds to see if they have the ability to inhibit GPx. In order to test these compounds, we have to be able to assay the activity of GPx. I will present my work developing the GPx assay so that we can test the N-heterocyclic compounds from the*



Tapu laboratory. The GPx assay is coupled to glutathione reductase (GRase). Since oxidized glutathione is a product of the GPx assay, we can monitor GPx activity through the oxidation of NADPH by GRase and use this to test inhibition by the Tapu lab compounds.

### ***Oxygen environment-dependent modulation of growth factor response in cancerous cells***

Poster Presentation - [Join now.](#)

4:15pm-4:30pm

Undergraduate Student(s): Christopher Alcott, Kersten Forsberg

Research Mentor(s): Carol Chrestensen

*In homeostatic conditions, different tissues in the body require varying levels of available oxygen. However, in certain disease states – such as tumor hypoxia or ischemia/reperfusion injury – these oxygen levels can be altered. While some consequences of changes in oxygen levels are known, as in HIF1 $\alpha$ -mediated intracellular responses to hypoxia, the effects of lesser changes on many cellular processes are yet to be identified. Here, we sought to understand the effect of differing oxygen levels on cellular responses to growth factor stimulation by culturing the human cancer cell lines MCF7 (invasive ductal carcinoma) and U2OS (osteosarcoma) in either 6% or 21% oxygen and stimulating them with epidermal growth factor (EGF). At set time points after stimulation, percent phosphorylation of extracellular signal-regulated kinase isoforms 1 and 2 (ERK 1 and 2), which function downstream of the EGF receptor, was measured via immunoblotting. In MCF7 cells, percent phosphorylation in 6% oxygen was shown to be distinctly higher than in 21% oxygen while in U2OS cells such a distinction was not seen, however there is a significant deviation in the percent phosphorylation values between separate time courses of the same cell type. Additionally, the phosphorylation of ERK 1 and 2 differed in both cell types and both oxygen environments. These data could suggest variations in oxygen environment-dependent outcomes of growth factor stimulation between epithelial tissue- and connective tissue-derived cancer cells and also may provide evidence of oxygen-dependent regulatory differences between ERK isoforms 1 and 2.*

### ***Activated Carbon Pore Expansion using Acidic Hydrothermal Method***

Poster Presentation - [Join now.](#)

2:45pm-3:00pm

Undergraduate Student(s): Max Thompson, Benjamin Johnson

Research Mentor(s): Altug Poyraz

*Petroleum Coke is a widely abundant, high carbon content material produced as a byproduct of the oil refining process. Its abundance makes the price per ton low and it is produced in almost all regions of the world. Due to the low price and high carbon percentage, commercial companies make large amounts of activated carbon using petroleum coke as a precursor. These activated carbons are characterized by their high surface area and can achieve widely varying pore morphology with different activation processes. The goal of this work is to achieve a homologous mesopore activated carbon material for use in super capacitor and catalysis applications using commercial activated carbon. Using a mixture of nitric*

acid and sulfuric acid, the mostly microporous (pores of diameter less than 2nm) petroleum coke derived activated carbon are etched away to make meso-pores (diameter between 2nm and 50nm).

### ***Solid-state Redox Synthesis of Layered birnessite-type Manganese Dioxide ( $\delta$ -MnO<sub>2</sub>) as Aqueous Supercapacitor Electrodes***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Armando Rodriguez Campos

Research Mentor(s): Altug Poyraz

Nanostructured manganese dioxides are attractive cathode materials in aqueous supercapacitors due to their low cost, environmental benign nature, high theoretical gravimetric capacitance, and power in neutral aqueous electrolytes. In this work, a layered birnessite-type manganese dioxide ( $\delta$ -MnO<sub>2</sub>) is synthesized utilizing solid-state redox method with superoxide. The effects of temperature and oxidant amount on the physicochemical properties of  $\delta$ -MnO<sub>2</sub> are characterized using Elemental Dispersion X-ray (EDX) spectroscopy, X-ray diffraction (XRD), N<sub>2</sub>-sorption, and Scanning Electron Microscope (SEM). The physicochemical properties that are specifically analyzed by varying synthesis conditions pertain to the chemical composition, morphology, and surface area of various  $\delta$ -MnO<sub>2</sub> materials. Through EDX spectroscopy, a link between potassium content and temperature is found with potassium content in the material rising to a maximum of 10.24% with the synthesis temperature at 160°C. The electrochemical performance of  $\delta$ -MnO<sub>2</sub> was evaluated utilizing 3-electrode beaker cells with 1.0 M Na<sub>2</sub>SO<sub>4</sub> as the aqueous electrolyte. The 3-electrode beaker cell consisted of a stainless-steel gauze working electrode, a graphite counter electrode, and an Ag/AgCl reference electrode. Electrochemical tests (cyclic voltammetry) were performed with the synthesized variants of  $\delta$ -MnO<sub>2</sub> and demonstrated high capacitance with values such as 162.87 F/g at a scan rate of 2mV/s and 107.4 F/g at a scan rate of 20 mV/s.

## **Physics**

### ***Physical properties of polar magnetic oxide HoCrWO<sub>6</sub>***

Poster Presentation - [Join now.](#)

3:15pm-3:30pm

Undergraduate Student(s): Christian Bucholz

Research Mentor(s): Chetan Dhital

Polar magnetic oxides are interesting systems to study due to the possibility of hosting functional properties such as ferroelectricity, piezoelectricity etc. In this work, a new compound HoCrWO<sub>6</sub> is synthesized using high temperature solid state reaction and characterized using x-ray diffraction, neutron diffraction, magnetization measurements and dielectric measurements. The x-ray and neutron diffraction results indicate that HoCrWO<sub>6</sub> crystallizes in polar (non-centrosymmetric and achiral) orthorhombic structure  $Pn2_1$ . The magnetization measurements indicate that HoCrWO<sub>6</sub> exhibit

*paramagnetic to antiferromagnetic transition at  $T_N = 24$  K. The magnetic structure is also determined using neutron diffraction. The magnetic structure represents collinear arrangement of Cr spins and non-coplanar arrangement of Ho spins. The dielectric measurements indicate a weak anomaly at the magnetic transition.*

### ***Physical properties of polar magnetic oxide HoFeWO<sub>6</sub>***

Oral Presentation - [Join now.](#)

9:30am – 9:45am

Undergraduate Student(s): Duy Pham, Christian Bucholz

Research Mentor(s): Chetan Dhital

*Polar magnetic oxides are interesting systems to study due to the possibility of hosting functional properties such as ferroelectricity, piezoelectricity, etc. In this work, a new compound HoFeWO<sub>6</sub> is synthesized using high-temperature solid-state reaction and characterized using x-ray diffraction, neutron diffraction, magnetization measurements, and dielectric measurements. The x-ray and neutron diffraction results indicate that HoFeWO<sub>6</sub> crystallizes in polar (non-centrosymmetric and achiral) orthorhombic structure  $Pn2_1$ . The magnetization measurements indicate that HoFeWO<sub>6</sub> exhibit paramagnetic to antiferromagnetic transition at  $T_N = 18$  K. The dielectric properties at room temperature indicate that the dielectric constant decreases with an increase in frequency indicating the low-frequency dielectric behavior are dominated by the external effects such as interface polarization.*

### ***Simulation of a Cosmic Ray Muon Detector***

Oral Presentation - [Join now.](#)

10:30am – 10:45am

Undergraduate Student(s): Christian Perez

Research Mentor(s): David Joffe

*The Society of Physics Students at Kennesaw State University is working on designing portable cosmic ray muon detectors. The detectors consist of a series of small parallel-plate capacitors which operate at low voltage to detect ionization currents in ambient air, in order to be robust enough for a variety of outdoor muography applications. The detectors have been tested in the laboratory and are able to observe the direct ionization currents from 0.9 microcurie alpha and beta sources without any additional amplification. In addition to laboratory testing the detectors have been simulated in GEANT4, a C++ HEP toolkit developed by CERN, to ensure a better understanding of the signal and help increase the sensitivity. The detector simulation consists of detector construction identical to the physical model, various run parameters to test different applications, and data collection for comparisons. This talk will focus on both the running of the GEANT4 simulation itself and its results on the detectors.*

## **Mathematics**

### ***Solving the Radial Time-Dependent Schrödinger Equation for a New Class of Screened Coulomb Potentials***

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Nick Hancock

Research Mentor(s): Eric Stachura

*In quantum mechanics, the Schrodinger equation allows us to describe the behavior of a system mathematically, much like how Newton's laws describe our macroscopic world. However, for a system of many bodies, solving it explicitly quickly becomes a near-impossible task. Time-dependent density functional theory gives us a useful framework for modeling these systems and their properties based solely on the theoretical positions of particles in space. Within this context, examination of the properties of a new class of potentials for a hydrogen atom reduces the time-dependent Schrodinger equation to a system of ordinary differential equations by setting the wavefunction equal to a product of three functions of spherical coordinates  $r$ ,  $\Theta$ ,  $\Phi$ . Our focus is on the radial equation, an eigenvalue problem in which exact solutions that satisfy it have yet to be found. Our goal is to correctly determine the change of variables needed to ensure solvability of this equation.*

### ***The Quest for 31***

Poster Presentation - [Join now.](#)

1:45pm-2:00pm

Undergraduate Student(s): Trent Geisier

Research Mentor(s): Joseph DeMaio

*Certain NFL fanatics crave to travel to all 31 stadiums to watch each of the 32 teams play at home. These fanatics want to understand the different NFL sub-cultures through an intimate experience at each home team's location with its unique traditions and fans. Visit [www.QuestFor31.com](http://www.QuestFor31.com) to meet some real fans attempting such an achievement. Although one may consider the "Quest for 31" a lifetime goal, this paper investigates how to accomplish the feat in the fewest number of weeks in an NFL single regular-season. Two methods, a greedy sequential search and a global search, are investigated and compared in detail.*

### ***Eulerian walk and DNA sequence assembly***

Poster Presentation - [Join now.](#)

9:45am-10:00am

Undergraduate Student(s): Yifan Zhu

Research Mentor(s): Joseph DeMaio

*Children like jigsaw puzzles, and the way to assemble the puzzle is by putting together pieces that match, one by one, till the puzzle is complete. DNA sequence assembly could be thought of as something similar: when a strand of DNA is passed into a particular "sequencing machine", it gives a large*

number of short reads of the DNA sequence. This type of technology is called shotgun sequencing. These reads form the jigsaw pieces in the puzzle and one must put together these pieces in an intelligent way to obtain the original sequence. There is, however, a catch here; apriori, we do not know what the original sequence or the “jigsaw big picture” looks like. Yet, the philosophy remains the same: to connect pieces or reads which are similar and hope that the “big picture” is reconstructed.

## **Molecular and Cellular Biology**

### ***S-layer Increases Predation Ability of Myxococcus Xanthus***

Poster Presentation - [Join now.](#)

3:45pm-4:00pm

Undergraduate Student(s): Rooman Karmacharya

Research Mentor(s): Ramya Rajagopalan

*Background: Myxococcus xanthus* is a gram-negative soil bacterium that exhibits micro-predatory activities. When starved, *M. xanthus* produces resistant spores within fruiting bodies for survival. The S-layer is a paracrystalline structure intertwined in many different patterns and is composed of proteins or glycoproteins. A species that produces the S-layer is *Aeromonas*. *A. salmonicida* is a strain of *Aeromonas* that infects fish. *A. hydrophila* is another pathogenic strain that causes a wide range of human diseases. We investigated the ability of the S-layer to protect *Aeromonas* from predation by *Myxobacteria*. *Methods: Myxococcus* and prey *Aeromonas* cultures were standardized to a concentration of  $10^9$  and  $10^{10}$  cells per ml and spotted 1mm apart on partial starvation agar media. Predation assay plates were incubated for up to 72 hours and samples collected at 48 h and 72 h. Fruiting body and sonication-resistant spore counts were performed to determine the number of fruiting bodies and spores formed by *M. xanthus* under different conditions. *Aeromonas* strain Ahy1127 (S-layer +) was more susceptible to predation by Myxo. strain DK1622. *Aeromonas* ATCC7966 (S-layer -) was the least susceptible. All strains showed a decrease in surviving prey cells compared to the control spots. There was a greater difference in number of surviving prey cells after predation when compared to prey only control spots for S-layer plus strain Ahy1127 than for S-layer negative strain ATCC7966. *Results: Polymerase Chain Reaction* was performed to verify the presence of the S-layer gene in various strains of *Aeromonas*. *Aeromonas* strains were grown in Brain Heart Infusion broth at 30°C for 24 h without shaking. Growth of the culture as a sediment was taken as an indication for the presence of the S-layer. *Conclusion: The presence of the S-layer appears to enhance the predation ability of M. xanthus.* Future directions would be to insert the S-layer genes into a S-layer negative *Aeromonas* strain such as ATCC7966 and repeat the predation assay. If the strain becomes more susceptible to predation on acquiring the S-layer, this would support the inference that S-layer enhances predation ability of *Myxococcus xanthus*.

### ***Chlamydomonas reinhardtii* Functional Verification of Putative Flagellar Genes**

Poster Presentation - [Join now.](#)

11:00am-11:15am



Undergraduate Student(s): Faiza Amatul-Hadi  
Research Mentor(s): Jennifer L. Cooper

*Chlamydomonas reinhardtii* is a single-celled alga with two flagella that is essential for research on cilia and flagella. The genome sequencing was completed in 2007, but the function of ~30% of genes remain unverified. To confirm the function of some of the ~5,000 unverified genes, putative genes whose functions were unverified were selected based on the possibility of a detectable change in phenotype after mutation. We focused on flagella because of the use of Chlamy as a model for flagellar structure and function. Four lines with insertions in hypothetical flagellar genes were obtained. The DNA from each strain was isolated and then amplified with control primers in order to test the DNA quality. Afterwards, gene-specific primers were used to test for the presence of the insertion in the putative gene. Our PCR results for strain FBB19 showed that the DNA was of high quality, giving good results with the control primers. FBB19 DNA was tested with its gene-specific primers and the presence of the insertion was confirmed. The next step for FBB19 is to start testing whether the phenotypes match the putative function. We will replicate these steps for the other strains in order to verify the hypothesized function of the genes. If phenotypes that match the hypothetical functions for these putative genes can be observed, this would provide important feedback for genome annotation as well as providing more flagellar targets for study.

### ***Bacteriophages Infecting Enterobacter cloacae to Reduce BLOATER Damage in Fermented Cucumbers***

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Graduate Student(s): Samantha Thompson

Research Mentor(s): Jean Lu

Fermented cucumbers are one of the most important fermented vegetables consumed worldwide. During cucumber fermentations, certain undesirable changes may occur. One of such changes is known as bloater defect (hollow cavities in fermented cucumbers), which is primarily caused by gas-producing bacteria including *Enterobacter cloacae*. BLOATER defect lowers product quality and leads to significant economic loss to the pickle industry, and effective preventative methods are needed. Bacteriophages (phages) are highly host-specific bacterial killers. Use of phages to control unwanted bacteria in foods is a promising approach because phages do not change food properties. This research was to isolate, characterize, and evaluate phages infecting *Enterobacter cloacae*. Two phages,  $\Phi$ 107E-p1 and  $\Phi$ 115E-p2, were isolated. The transmission electron micrographs revealed that both phages belong to the Siphoviridae family. The host range study showed that  $\Phi$ 107E-p1 has a broad host range. In contrast,  $\Phi$ 115E-p2 had a narrow host range. One-step growth curves showed that the two phages have similar latent periods and large burst sizes. Restriction analysis of the phage DNAs demonstrated that the two phages are genetically different. The effectiveness of the phage infection against their hosts were evaluated in cucumber juice as a model food system. Phage infection at the multiplicity of infection of 0.1 caused rapid decrease in cell concentration, suggesting that these phages are potential candidates for



*use in cucumber fermentations to reduce the incidence of bloaters. More research is needed to further evaluate the efficacy of the phage infections against their hosts in cucumber fermentations.*

### ***In Silico Identification of a Streptococcus Phage from an Unpasteurized Dairy Product***

Poster Presentation - [Join now.](#)

4:15pm-4:30pm

Undergraduate Student(s): Daisy McGrath, Kathryn Croker

Research Mentor(s): Tsai-Tien Tseng

*This study aimed to identify novel phages from a West African dairy product, nunu, to better understand the uncharacterized virosphere of a food microbiome. Nunu is a yogurt-like product from spontaneous fermentation of unpasteurized cow milk without a standardized starter culture. Phages and their bacterial hosts make up a microbiome, where their collective metagenome can be studied in silico, or computationally, after next generation sequencing (NGS). The targeted dataset for our study can be found in the Sequence Read Archives under the accession number of ERX2041567. This study utilized several bioinformatics software tools with customized settings: Kraken2, MetaVelvet, Edena, NCBI-BLAST, SPAdes, and SeaView. Novel reads that are unrelated to previously characterized phages were first isolated by Kraken2. MetaVelvet, Edena and SPAdes were used to provide contigs that represent potentially new phage sequences via de novo assembly. Functional characterization of these contigs were carried out with blastn and tblastx to identify similar open reading frames from databases. SeaView was also used to visualize evolutionary lineages between potentially new phages and previously uncharacterized ones with multiple alignments and phylogenetic trees. As a result, we will present preliminary data that revealed several contigs from a novel phage with potential functions of capsid and terminase that are like ones from Streptococcus phage Str-PAP-1, along with several hypothetical proteins. Its tail protein and helicase were found to be closely related to a phage that infects Streptococcus gallolyticus. In addition to above, another contig contains an open-reading frame for PblA that shares similarity with bacterial adhesins from Streptococcus mitis for attaching to human platelets. In conclusion, our study further characterized the virosphere of the nunu microbiome. And this putatively identified phage have the potential to serve as a biocontrol agent in food processing facilities.*

### ***In Silico Isolation of a Novel Phage for Food Safety Applications against Pathogenic E. coli***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Daisy McGrath

Research Mentor(s): Tsai-Tien Tseng

*With the advent of next-generation sequencing (NGS) on metagenomes, the elucidation of all genetic material from microbiomes has prompted a renewed interest towards uncultivated members of the virosphere. We describe the discovery of a novel phage from a metagenomic dataset on the West African fermented dairy product, nunu, with a custom bioinformatics workflow to potentially serve as a biocontrol agent against pathogenic E. coli. Initial dataset of ERR2014814 from NCBI was first*

subjected to Kraken2 to extract novel sequencing reads for further de novo assembly into contigs by MetaVelvet. Resultant contigs served as potential partial phage genomes, then searched against databases to find closest characterized homologous sequences for potential functional determinations and any previously published phages for phylogenetic relatedness. References further assembled several contigs for the genome of this novel phage with both SPAdes and Bowtie2. Gaps were then closed with AlignGraph. A full assembled genome at 41,601bp in length was generated using Escherichia phage vB\_EcoM\_ECOO78 as a reference genome. The average GC content was 55%, similar to vB\_EcoM\_ECOO78, but lower by 4%. Local similarity on the 5' end to Enterobacter bacteriophage Arya was also observed. Several similar open reading frames (ORFs) were found to share similarity with ones from vB\_EcoM\_ECOO78. For example, an ORF from this novel phage shares 75% identity on the amino acid level to the tail protein of vB\_EcoM\_ECOO78. Its overall demonstrable sequence similarity towards vB\_EcoM\_ECOO78 also implies the potential to infect E. coli. Our discovery of a novel phage will provide a potentially new biocontrol agent as a natural enemy of E. coli with targeted and timely actions to improve the overall food safety in various products. Furthermore, our customized bioinformatics workflow could also serve as an enhanced protocol towards the detection of novel phages from other microbiomes.

### ***The Role of Proneural Transcription Factor ngn-1/neurogenin during Caenorhabditis elegans Embryonic Development***

Poster Presentation - [Join now.](#)

2:30pm-2:45pm

Undergraduate Student(s): Michaela Crego, David Jimenez, and Claire Simms

Research Mentor(s): Martin Hudson

Accurate control of neuronal cell identification and movement is crucial to embryonic development. Defects in this process can lead to neurodevelopmental disorders, creating an imperative for further study. The transcription factor neurogenin is required for multiple neurodevelopmental processes during vertebrate embryonic development and mutations in this gene underpin multiple human neurological disorders. Despite this, little is known about how this gene controls nervous system development and function. Neurogenin is deeply conserved across phyla. As such, we can investigate neurogenin function in simple systems such as the nematode *Caenorhabditis elegans*, which has a close ortholog of neurogenin, *ngn-1*. Previous work in the Hudson lab revealed that *C. elegans* *ngn-1* mutants have 45% embryonic lethality. Using time-lapse video microscopy, we found that most *ngn-1* mutants die during the "elongation" phase of development when the worm embryo is "squeezing" itself into a worm shape. We find that the primary source of death is via epithelial rupture in the posterior ventral region, close to the ano-rectal junction. We used a marker of epithelial junctions, *ajm-1::GFP*, to highlight epithelial cell-cell boundaries during development. We find that *ngn-1* mutants have defects in the gut-to-epithelial boundaries at the 1.5 stage of embryonic development. This suggests that *ngn-1* is required for the proper specification of the crucial developmental event. Work is on-going to understand why a proneural transcription factor is required for epithelial integrity.

## ***Understanding Molecular Mechanisms Controlling Muscle Type Specificity***

Poster Presentation - [Join now.](#)

2:00pm – 2:15pm

Undergraduate Student(s): Max Andrews

Research Mentor(s): Anton Bryantsev

*Skeletal muscle is a compound tissue made of individual muscle fibers. To accommodate everyday activities, such as walking, running, jumping, etc., our muscles are composed of several types of fibers, each expressing a unique set of muscle genes. Interestingly, early in development all muscles in the body are made of the same fiber type, but later they acquire different properties. The mechanism of muscle fiber diversity is not clear, although it may be critical in treating muscle-related diseases or enhancing physical performance. The goal of my project is to identify critical genes and possible mechanisms that control the fate of muscle fibers.*

## ***Cyclase-associated actin regulator capulet influences structural muscle proteins clearance in the Drosophila model of muscle atrophy***

Oral Presentation - [Join now.](#)

1:30pm-1:45pm

Graduate Student(s): Aaron Aghai

Research Mentor(s): Anton Bryantsev

*Muscle atrophy (MA) is a condition of muscle mass loss due to accelerated protein degradation in muscle fibers. Some pathological conditions, such as chronic inflammation or cancer, induce accelerated MA, which complicates medical treatment, hampers recovery of fragile patients, and ultimately can be the cause of a patient's death. To gain better control over MA, more information is required about the whole spectrum of genetic factors that can influence MA. Drosophila provides an excellent platform for genetic screening, although it has somewhat limited utility for MA research due to a lack of plasticity in insect muscles. We used Drosophila flight muscles to employ a model of simulated MA, in which experimentally induced muscle actin knockdown causes concomitant degradation of actin-associated proteins, such as tropomyosin (Tm) and troponin C (TpnC4). In parallel, actin-depleted muscles demonstrate upregulated expression of approximately 120 genes that could be potentially implicated in the accelerated removal of actin-associated proteins. Using these genes as candidates, we screened for those genes that had not been previously implicated in protein degradation but would have an effect on Tm and TpnC4 clearance in actin-depleted muscles. One screen hit was produced by the gene capulet(capt), knockdown of which increased retained amounts of Tm and TpnC4 by 6-9 folds (40% vs 6% for Tm and 20% vs 2.5% for TpnC4). Capt codes for adenylate cyclase-associated protein, involved in actin filament dynamic regulation. We hypothesize that capt acts to promote actin depolymerization and contractile apparatus disassembly in the course of MA. Interestingly, elevated expression of the mammalian capt homolog (CAP1) has been reported for MA-inducing conditions: dermatomyositis in humans and muscle denervation in rats. Overall, our data indicate that capt could be a new conservative pro-MA factor.*

### ***Complimenting a Chlamydomonas reinhardtii Mutation Using Cell Penetrating Peptides***

Poster Presentation - [Join now.](#)

1:45pm-2:00pm

Undergraduate Student(s): Matthew McKenzie

Research Mentor(s): Jennifer Cooper

*Chlamydomonas reinhardtii* is a photosynthetic model organism most notable for its easily manipulatable genetics. *C. reinhardtii* uses flagella to swim and optimize its growth conditions in the light. We plan to use cell penetrating peptides (CPPs) to compliment *C. reinhardtii* that is affected with the IFT46 mutation. Cell penetrating peptides are short peptides that can move across a cell membrane. The novel CPP that we are using is called TaT-CaM. It consists of the trans-activator of transcription (TaT) and the calmodulin domain (CaM) that binds to a calmodulin binding site (CBS) engineered into our protein of interest, IFT46. IFT46 is an Intraflagellar Transport Protein (IFT) required for flagella assembly. The IFT46-1 mutant causes paralyzed flagella. Previous results have shown TaT-CaM is an effective way to deliver protein into *C. reinhardtii*. To complement the IFT46 mutation using CPP, we must express the CBS-tagged IFT46 protein (CBS-IFT46). I have transformed bacterial competent cells with the CBS-IFT46 plasmid, attempting to make the competent cells express the protein. I have performed restriction digests to ensure the CBS-IFT46 sequence was properly inserted into the vector. The digest results indicate the DNA was inserted into the vector correctly, but I have been unsuccessful in getting the bacterial cells to express the CBS-IFT46 protein. In the future, we will send samples of the clone plasmid to be sequenced and potentially a different expression vector will be used. Completion of this work will show that CPPs have novel use, allowing efficient protein introduction into the cell.

### ***The role of cnd-1 in mitochondrial biogenesis during Caenorhabditis elegans nervous system development***

Poster Presentation - [Join now.](#)

11:15am – 11:30am

Undergraduate Student(s): Tessa Jordan, Detavious Veal

Research Mentor(s): Martin Hudson

Mitochondria are responsible for energy production in cells. Mitochondrial defects underpin a plethora of neurological conditions including Parkinson's disease, creating an imperative for further study. When cells are oxidatively stressed, energy production decreases and stress responses increase. Transcriptome data from the Hudson lab showed that the transcription factor *cnd-1* controls aspects of mitochondrial gene expression, although how this occurs at the molecular level is not known. Using a mitochondrial GFP reporter gene whose expression is specific to the touch neurons, we examined mitochondrial distribution and morphology in wild type and *cnd-1* mutants. We found that mitochondrial morphology and distribution was normal in *cnd-1* mutants. We are currently using a mitochondrial stress response reporter gene to investigate if touch neurons (or other cell types) show defects in mitochondrial function in *cnd-1* mutants.

### ***Validating a Microbiopsy Sampling Technique for Morphological Analysis of Human Muscles***

Poster Presentation - [Join now.](#)

2:45pm-3:00pm

Graduate Student(s): Kaveh Kiani

Undergraduate Student(s): Melody Jabbari, Shania Kalladanthiyil, SooBin An

Research Mentor(s): Anton Bryantsev, Garrett Hester, Trisha VanDusseldorp, Irina Kolomiets

*Biopsy of muscle tissue has been a valuable method for clinical diagnostics and research. Traditionally, samples of muscle tissue are obtained via the Bergstrom needle biopsy, which is considered a moderately invasive technique as it requires an incision through the skin ranging from 5 mm to 10 mm. As an alternative, a minimally invasive micro biopsy technique that relies on fine needle aspiration has been introduced more recently. Originally, it was meant to produce samples for biochemical analyses. In this study, we want to make a case that the micro biopsy method is a valuable approach to obtain samples for morphological analysis. We have processed 7 biopsies from young males and 8 biopsies from elderly males, obtained with the micro sampling technique. On average, muscle sample sizes varied from 9 mg to 20 mg. Each biopsy produced sufficient amount of muscle tissue for three independent blocks of frozen tissue and an additional amount that could be used for molecular analysis. Frozen samples were sectioned and stained by immunofluorescence to reveal individual fiber types. Stained slides were imaged with confocal microscopy and subjected to morphological analysis. We report that the micro sampling technique has produced approximately 1,000 fibers per sample, on average. Batches of muscle tissue from the same person produced similar muscle fiber type ratios. Moreover, the samples provided enough statistical power to detect changes in fiber type composition, described in the literature for aging muscles: we detected size reduction for type 2X fibers and fiber type groupings. Overall, our result confirms that the micro sampling technique can be used for supplying material for morphological analysis of muscles.*

### ***The Antibiotic-Resistant Bacteria Crisis: Overcoming Methicillin-Resistant Staphylococcus Aureus (MRSA) by Myxobacterial Predation***

Poster Presentation - [Join now.](#)

3:15pm-3:30pm

Undergraduate Student(s): Basirat Olorunlambe

Research Mentor(s): Ramya Rajagopalan

*With the growing threat of antibiotic-resistant bacteria, the need for finding new antibiotics is at an all-time high. According to the Center for Disease Control and Prevention (CDC), there were over 2.8 million cases of antibiotic-resistant infections in the United States in 2019 and over 35,000 individuals have died from them. Methicillin-Resistant Staphylococcus Aureus (MRSA) accounts for 323,700 of these cases, with 10,600 deaths. MRSA is a common cause of nosocomial infections. Although antibiotics are available to treat MRSA, such as Vancomycin, the possibility remains that these strains are likely to develop a resistance to these compounds as it has done with other antibiotics. The goal of*



*this project is to test MRSA against various strains of Myxobacteria, to see if we can develop a way for Myxobacteria to successfully treat MRSA infections. Myxobacteria are predatory bacteria found in soil and produce several antibiotics such as Myxovirescin. Through gliding motility, they are able to move toward prey and release enzymes that aid in predation. We have done predation assays with different Myxobacteria strains preying over MRSA. We have also found that our wild-isolate strains of Myxobacteria show enhanced predatory behavior than lab reference strains. This can be useful in finding a more effective strain to fight MRSA infections. Due to Myxobacteria's unique predatory behavior, this can be a breakthrough in fighting antibiotic-resistant bacteria as well as possibly developing a Myxobacteria antibiotic that doesn't readily lend to the development of antibiotic resistance with continued use. Nosocomial infections have shown to pose a threat in healthcare especially for immunosuppressed patients in healthcare facilities. This research project aims to provide sufficient data and results that can help in fighting this issue, starting with MRSA.*

***Effectiveness of bacteriophages against bloater-causing bacteria Enterobacter cloacae in a model food system***

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Dzhuliya Ignatova, Sandra Kopic, Ashley Reed, Unique Sardeneta  
Research Mentor(s): Jean Lu

*Cucumber fermentation is one of the most important vegetable fermentations in the United States and Europe. Enterobacter cloacae and other gas-producing bacteria can cause bloater defect (the gas pockets or hollow cavities formed in fermented cucumbers) which lowers the quality and the yield of fermented cucumbers, thereby resulting in significant economic losses to the pickling industry. Cost-effective strategies to control E. cloacae and other microbiota need to be developed. Using bacteriophages (phages) to eliminate undesired bacteria is an emerging and promising biocontrol method. Our lab recently isolated two phages, F107E and F115E, infecting E. cloacae strains 107E and 115E, respectively. In this study, we measured 1-step growth curve of phage F107E at a multiplicity of infection (MOI) of 0.01 and 37°C in cucumber juice. The data showed that the eclipse period (not including 10-min adsorption) is only 10 min and the burst size is 28 virions per infected cell. We also evaluated the effectiveness of the two phages as biocontrol agents against E. cloacae in cucumber juice. The infection with F107E at MOI of 100 or 1 effectively eliminated its host within 2 or 3 hours, indicating very high lytic activity against its host. The infection with F115E at MOI of 0.2 or 0.02 caused more than 3 log unit reduction in its host concentration within 2 or 3 hours. But thereafter, phage-resistant bacterial mutants emerged. Thus, phage F107E has a greater potential to be used in commercial cucumber fermentation to eliminate its host in order to reduce bloater defect.*

***Examining effects of the DNA regulator Lrp on quorum sensing gene expression in Pseudomonas aeruginosa***

Oral Presentation - [Join now.](#)

11:45am-12:00pm



Undergraduate Student(s): Bradley Lumsden  
Research Mentor(s): Melanie Griffin

*Pseudomonas aeruginosa* is an opportunistic human pathogen that has the capacity to express multiple virulence factors that are regulated through an extensive quorum sensing network. Three major quorum sensing systems have been identified in *Pseudomonas* species: the acyl homoserine lactones of *las* and *rhl*, and the *Pseudomonas* Quinolone Signal (PQS). We seek to investigate the involvement of a global regulator, Lrp with the expression of these three networks. Specifically, we will compare expression levels of *las*, *rhl*, and *pqs* in wild type *P. aeruginosa* (MPAO1) with an *lrp* transposon insertion mutant using quantitative PCR. Through this comparative qPCR analysis, we hope to support the identification of novel roles of the Lrp DNA regulator involvement in cross-talk with the quorum sensing pathways that has not been previously recognized. Due to the virulence of *Pseudomonas aeruginosa*, if Lrp can be identified as a factor in the regulation of the quorum sensing networks, it could potentially be used as a therapeutic target in the disruption of the production of many virulence factors such as biofilms, siderophores, toxins and motility which are all regulated by the quorum sensing networks.

### ***Temperature Changes seen in Lower Extremities after CPN Local Anesthetic Block***

Poster Presentation

Not Presenting

Undergraduate Student(s): Lora Asberry, Linda Le, Jeavanie Desarmes  
Research Mentor(s): Stephen Barrett

Many older patients often suffer from walking issues such as Drop Foot. Drop Foot is caused by the malfunction of nerves in the foot, resulting in the loss of control of the front foot muscle. Within all of our patients, there has been a common fibular palsy, caused by the entrapment of the peroneal nerve. Due to this, they cannot lift up their foot. Some cases are permanent, while others are temporary. In the temporary cases, we have indicated a Phoenix Sign. The Phoenix Sign indicates that a nerve, presumed to be dead, has the capability to be recessed back to life. To ensure that this nerve can be brought back to life, our study is testing the effects of Lidocaine on the patient's lower extremities. Lidocaine is a local anesthetic, used as a sodium channel blocker and vaso-dilator. Thermography will be used to see if there are any temperature changes in the foot and lower extremities after the Phoenix Sign Block.

### ***Identification of phenotypic defects in the zinc finger transcription factor ztf-29***

Poster Presentation – [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Trae Dunn  
Research Mentor(s): Martin Hudson

Aging and many aging-associated diseases such as Alzheimer's disease and cancer are characterized by a progressive decline in physiological functions and a decline in the ability to respond to stress. The underlying causes for many aging-associated diseases are unknown. Identifying genes that control

normal aging will advance our understanding of the molecular changes that underlie the aging process and might help treat age-associated diseases. In order to get a better understanding of the molecular mechanisms behind these diseases, we utilize the nematode *Caenorhabditis elegans* as a model organism to examine defects in physiology and aging. The human PRDM genes code for zinc finger transcription factors, and mutations in these genes are associated with mixed lineage leukemia and other cancers. To gain a better understanding of how PRDM genes work at the molecular level and how they interact with other cancer and aging related genes, we examined a mutation in *ztf-29*, which is the *C. elegans* ortholog of PRDM16. Using a *kal-1-GFP* reporter gene, we found that *ztf-29* mutants exhibit defects in head neuron positioning, including localization and morphology. We also analyzed *ztf-29* mutants for behavioral phenotypes using video tracking, which revealed defects in locomotion including a significant reduction in the average number of reversals performed. Finally, we used a mitochondrial stress reporter gene to determine if *ztf-29* has roles in mitochondrial homeostasis. We find that *ztf-29* mutants exhibit chronic mitochondrial stress responses, suggesting that *ztf-29* may have a role in mitochondrial gene regulation and/or function. Based on these results, we conclude that *ztf-29* plays a significant role in *C. elegans* nervous system development along with the maintenance of mitochondrial physiology. Work is on-going to rescue *ztf-29* mutant phenotypes and to gain a better understanding of what other genes *ztf-29* might be working with during normal development and physiology.

### ***Creation of Spheroplasts to Introduce Cargo into Dinoflagellates via Cell Penetrating Peptides***

Poster Presentation - [Join now.](#)

2:45pm-3:00pm

Undergraduate Student(s): Max Warner

Research Mentor(s): Jennifer Cooper

The dinoflagellate *Cryptocodinium cohnii* is an important part of the marine food chain and is used to produce nutraceutical products such as docosahexaenoic acid (DHA). Despite its importance, technologies to transfect genes or proteins are non-existent for *C. cohnii*, most likely due to difficulties in transporting macromolecules across the plate-like structures known as the theca which encompass the cell. We are using a novel cell penetrating peptide (CPP) system as a means to overcome this barrier. CPPs are a class of short peptides that can cross the cell membrane in a variety of species, and are known to cross the cell wall in some. Microscopic imaging of *C. cohnii* cells treated with CPP linked to fluorescently labeled cargo demonstrates that CPPs increases uptake of cargo within cells while fluorescently labeled cargo-only treatment does not cause extensive cargo association with cells. We are attempting to create *C. cohnii* spheroplasts, cells having a deficient cell wall, to increase the uptake of cargo. Success of our method will provide a new means for rapid introduction of macromolecules into *C. cohnii* cells, allowing both investigation of their cellular function and potential manipulation of economically important products.

### ***Modifying Yeast: Delivering the Goods***

Poster Presentation

Not Presenting

Undergraduate Student(s): Margot Aldana, Arie Henderson, Krista Barbour  
Research Mentor(s): Melanie Griffin

*The cell-penetrating peptide (CPP) TAT-CaM has previously been shown to mediate the delivery of peptides only into mammalian cells. The Griffin lab has recently demonstrated that TAT-CaM can also be used to deliver cargo protein into select fungal cell lines. This is significant because fungus have wide-spread involvement in diverse fields of science, including biotechnology, genomics, fermentation science. They also are of medical importance as fungal infections, predominantly yeast, impact up to 300 million lives annually, resulting in 1.6 million deaths. The facilitation by TAT-CaM of the entry of biomolecules across the cell wall and into fungal cell cytoplasm potentiates the delivery of other relevant proteins into fungal cells to manipulate, improve, or disrupt the normal functioning of these cells. This study seeks to expand on the diversity of biomolecules delivered into yeast and demonstrate their activity. In this study, we want to explore the spectrum of molecules that can be delivered into the recipient yeast cells. We have selected chitinase, a bacterial enzyme from the insect pathogen *Bacillus brevis* bacterial enzymes, lipase and exotoxin A, two enzymes from *Pseudomonas aeruginosa*. Lipases have utility in oil-degradation thus have bioremediation potential. Chitinases degrade chitin-rich walls found in fungus and insects thus making it attractive for use as an antifungal and in insecticides while exotoxin A is a cytotoxin and lethal to many animal cells through the disruption of protein synthesis.*

### ***Evaluating Regional Agricultural Wastes as Substrates for the Mycelial Growth and Fruiting Body Yield of *Pleurotus ostreatus****

Oral Presentation - [Join now.](#)

4:15pm-4:30pm

Graduate Student(s): Daniel Rhiner

Research Mentor(s): Chris Cornelison, Kyle Gabriel

*Pleurotus ostreatus, commonly known as the oyster mushroom, is a widely cultivated culinary mushroom known for its ability to colonize a variety of lignocellulosic agricultural waste materials. The ability of *P. ostreatus* to colonize and decompose these types of wastes as growth substrates suggests a potential for this organism to be utilized in the conversion of agricultural waste streams into locally productive and regenerative systems. *P. ostreatus* is a saprophytic fungus that derives its nutrients from plant fibers, particularly lignin and cellulose. These compounds are decomposed by ligninolytic enzymes produced by the mushroom. Not only does the oyster mushroom decompose agricultural waste, the mushroom itself is a source of food for humans as well as ruminants. As the global demand for resources increases and resource availability declines, innovative approaches to resource management become increasingly valuable. The constant production of waste by conventional farming and the oyster mushroom's ability to convert this waste efficiently into food is a highly compelling reason for research that has the potential to lead to the commercialization of these processes. This research aims to explore the cultivation of local mushroom isolates on regional agricultural wastes on a commercial scale. This data will address the knowledge gap regarding the use of Georgia's agricultural wastes as mushroom substrate and the potential for increased mushroom yields and profit.*

### ***Breaking the code for nuclear domains: the case of b-bodies***

Poster Presentation - [Join now.](#)

3:45pm-4:00pm

Undergraduate Student(s): Miranda Adams

Research Mentor(s): Anton Bryantsev

*The eukaryotic nucleus is a busy place with a high concentration of proteins performing diverse functions. Despite the crowded environment and absence of internal membranes, nuclear organization remains structured via distinct areas that selectively recruit and release proteins – nuclear domains. How nuclear domains are formed and maintained is currently not well understood. B-bodies are a newly discovered type of nuclear domains that can be found in the indirect flight muscles of Drosophila; their principle resident is the RNA-binding protein Bruno. This protein has 3 RNA-recognizing motifs (RRM1,2,3) as well as two disordered regions. B-bodies are highly dynamic domains which appearance changes during myogenesis. We used ectopic expression of GFP-tagged Bruno mutants to identify critical regions in the primary sequence that are required for B-body targeting. Our results indicate that a functional RRM2 domain is required for Bruno trafficking to B-bodies. In contrast, the functionality of RRM3 domain is dispensable in this regard. We speculate that RRM2 domain may be necessary to interact with yet unknown structural RNA molecule(s) in order to retain Bruno in B-bodies.*

### **Ecology, Evolution, and Organismal Biology**

#### ***Does Cortisol Respond to a Social Perturbation in Captive Bonobos?***

Poster Presentation - [Join now.](#)

4:15pm-4:30pm

Undergraduate Student(s): Tiffany Ly

Research Mentor(s): Sarah Guindre-Parker

*All animals are influenced by their environment. For social species, this means that changes in group size or composition can have long-lasting effects on survival or reproduction. When these social species are placed in captivity and new individuals are introduced suddenly by zookeepers or researchers, these events can lead to stress by changing established dominance hierarchies. For example, these interactions can cause stress hormones—like cortisol in primates and humans—to be released in response to meeting unfamiliar individuals. We took advantage of an introduction event happening at a captive research and conservation facility to better understand how introducing a new female bonobo (*Pan paniscus*) to existing males and females at the facility shaped changes in cortisol. We collected daily urine samples to examine longitudinal changes in cortisol, including pre-, during, and post-introduction. Cortisol will be measured with a commercial enzyme immunoassay. We predict that individuals will perceive the introduction as a social perturbation which will result in a sudden rise in cortisol levels. We also predict that female bonobos will exhibit a sharper increase in cortisol levels upon the introduction of a new female member within the group compared to male bonobos because female-female competition is stronger in bonobos than male-female competition.*

***Building biology: Using an artificial ribbon fin system to understand locomotion of a gymnotiform swimmer, *Apteronotus albifrons****

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): Dante Orlando

Research Mentor(s): Olivia H. Hawkins, Victor Ortega-Jimenez, Chris Sanford

*Over the past decade, engineers have designed Autonomous Underwater Vehicles (AUVs) inspired by the gymnotiform swimmer, the Black ghost knifefish (*Apteronotus albifrons*). *A. albifrons* is highly maneuverable due to using its elongated anal fin which is referred to as a ribbon fin. Current AUVs inspired by this propulsive system use multiple servo motor inputs which could cause reduced efficiency. While these AUVs use multiple rods and servo motors to mimic fin rays, it is still unknown if all fin rays must be active to generate thrust. In order to understand the possibility of passive wave generation and suggest a more efficient AUV design, this project developed an experimental artificial ribbon fin (ARF) system using 4 foil thicknesses (0.002, 0.003, 0.004, 0.005 mm) attached to a control arm of a single servo motor oscillating at 3 frequencies (1.09, 0.7, and 0.48 Hz). Wave measurements were extracted in 2D from high speed videos (250 fps-1) using ImageJ. The thinnest (0.002 mm) and thickest (0.005 mm) foils were expected to be less comparable to previously observed wave measurements of the live animal. An intermediate foil (0.003 mm) displayed the closest wave measurement values at the oscillating frequency of 1.09 Hz. Significant differences in most wave measurements both within the foils across frequencies and among the foils at each frequency occurred. These preliminary results will supplement future efforts to develop a more realistic robotic model to be used in further exploration of this propulsive system.*

***Towards the identification of the soil microbiome community associated with Longleaf Pine***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Undergraduate Student(s): Tori Quillen, Brian Sassi, Joshua Inneh, Geoffrey Eger, Sarah Andrews, Lindsey Gard, Sara Grimm, Grace Krueger, Ian Thomasson, Chelsea Nix

Research Mentor(s): Paula Jackson, Joel McNeal, Thomas McElroy, Heather Sutton

*This project is part of a larger study looking at the restoration of the Long-leaf Pine ecosystem in certain Wildlife Management Areas (WMA) in Northwest Georgia. As part of this larger study another group of researchers has been looking at changes in the plant community in the same plots used for this soil microbiome research. Our long-term aim is to look for potential associations between the above and below-ground community structures. Although research has shown that the health and composition of the microbiome surrounding the roots of plants has a significant impact on the ability of plants to fight and survive various stressors (Wei et al. 2019), the full extent of the complex system of feedback mechanisms between the rhizosphere and soil microbiome, and the above ground plant communities is not yet understood. We collected soil samples from six plots located in the Sheffield WMA located in*



Paulding County, GA. Except for two plots at the savanna site, with slopes south or west facing; soil samples were collected from either north or south facing hillsides. Within each plot, samples were collected in sterile plastic tubes at the center of the plot and 10 m above and below from the center. Five random sub samples were taken from each tube for DNA extraction using a commercially available kit. Given that plant communities appear to differ between north and south facing slopes, we hypothesize that the soil microbiome will also differ significantly in north versus south facing areas. We also hypothesize that the microbiome in the savanna plots, which are actively being restored for Longleaf pine, will be distinct from all others.

### **Assessment of Bacterial Communities in Soils with Different Levels of Lead (Pb)**

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Jake Smith

Research Mentor(s): Thomas McElroy, Sigurdur Greipsson, Marina Koether

Soil lead (Pb) contamination is a recognized global health problem that has been shown to have adverse effects on human health. DNA metabarcoding provides high-throughput, taxonomic identification of community assemblages. This technique can estimate the biodiversity and relative abundance of bacteria in soils, and it can identify indigenous/ unique soil microorganisms within sampled locations. We did a preliminary assessment of the effects of Pb contamination on the microbiome of three sites in Georgia, USA. Soils with different levels of Pb-contamination were collected from: Decatur (20 ppm Pb), Hickory Grove (90 ppm Pb); Cedartown (3800 ppm Pb). Three sub-samples were collected from each location. We hypothesized that, as Pb levels increased in the soil: (1) diversity of soil microbes would decline, (2) diversity among samples would increase. Whole genomic DNA was extracted from ninety soil samples (10 from each sub-sample; 5 switchgrass root samples and associated soil; 5 soil samples) with ZYMO RESEARCH Fecal/ Soil Microbe DNA extraction kit. Five samples from each extraction group were pooled (total of 18 pooled samples (9 for 16S bacteria, 9 for root bacteria). Whole genomic DNA samples were 16S and 18S sequenced on an Illumina MiSeq platform and analysis included sequencing data output, sequence clustering into operational taxonomic units (OTU), diversity analyses, species classification and relative abundance analyses. Distinct soil microbial communities were detected amongst the three sites. Bacterial species abundance was not significantly impacted (20%) by the increased level of Pb. Bacterial communities showed some similarities among sites. The total number of species (OTU) detected at each site was not adversely affected by soil Pb level. In total, approximately 2000 species were identified and only some were found at all three sites. The Shannon similarity index suggested that bacterial communities were dis-similar among sites.

### **Detection and Identification of Arbuscular Mycorrhizal Fungi and Surrounding Microbiome in Two Riparian Tree Species**

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Lindsey Gard, Sarah Andrews, Brian Sassi, Grace Krueger, Tori Quillen, Ian Thomasson, Josh Inneh, Daphney Fievre, Sara Grimm, Geoffrey Eger  
Research Mentor(s): Paula Jackson, Thomas McElroy, Joel McNeal

*This research forms part of a larger project investigating the feasibility of using American Sycamore (Platanus occidentalis L.) in addition to Black Willow (Salix nigra Marshall) in restoration of riparian areas. Riparian vegetation functions in the regeneration of ground water sources, in the removal of excess nutrients and sediments from surface runoff, and in maintaining favorable environmental conditions for life in this system. Preliminary studies in our lab comparing the two riparian species, found that although both were colonized by arbuscular mycorrhizal fungi (AMF); the rates of colonization, as quantified under the microscope, differed among both species. In addition, recent research suggests that the plant root microbiome may play an important role in plant health and wellbeing and that plants may be able to influence their root microbiome, recruiting beneficial microorganisms and suppressing pathogens. We hypothesize that both riparian species will be colonized by the same AMF types, but will differ in other aspects of their microbiome community. To identify AMF within each plant root and establish whether samples came from each plant species, we extracted DNA from root samples using the DNeasy PowerSoil Kit (Qiagen). For the identification of AMF after DNA extraction, we targeted the small subunit of rRNA genes using AML1 and AML2 primers to amplify and distinguish among subgroups of Glomeromycota fungi. To identify the host plant DNA, a similar protocol was ran using AB101 and AB102 primers. The electrophoresis gels showed that most of our samples had very pronounced bands of amplified AMF DNA but had very faint or no bands of plant DNA. The microbiome results showed similar percent colonization of certain phyla among both species. The next step in our research is to distinguish the types of AMF in our sample roots and to repeat amplification of our plant DNA.*

### ***Individual variation in behavioral plasticity in African starlings***

Oral Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Jasmine Little

Research Mentor(s): Sarah Guindre-Parker

*Behavioral plasticity allows individuals to respond appropriately to highly variable environmental conditions in order to increase their fitness under different types of environments. Cooperatively breeding superb starlings (Lamprolaima superbus) living in unpredictable Kenyan savannas experience tremendous variation in annual rainfall from year to year. Rainfall is critical for these birds because it shapes the availability of food (insects), but it remains unclear how the parental care behavior of individual starlings is influenced by changes in rainfall. We combine a long-term dataset of superb starling parental care behavior with a mixed modeling reaction norm framework to test whether superb starlings show individual variation in their behavioral plasticity to changing rainfall. We also compare behavioral plasticity in response to changes in pre-breeding rainfall versus breeding rainfall. We will*

*discuss how individual variation in parental care or individual variation in behavioral plasticity of parental care may allow superb starlings to cope with raising young in unpredictable environments.*

## **Statistics and Analytical Sciences**

### ***Wireless Access: A Barrier to Entry?***

Poster Presentation - [Join now.](#)

1:45pm-2:00pm

Undergraduate Student(s): Kara R. Dees

Research Mentor(s): Susan Mathews Hardy

*Georgia libraries receive hundreds of thousands of dollars in funding each year to provide high-speed Internet access. However, the FCC Internet access maps used to allocate these funds are inaccurate. In 2018, Georgia State Senator Steven Gooch authored and obtained passage of a bill that allowed Georgia to create its own broadband maps focusing on individual locations instead of census tracts. My research adds to this ongoing effort in Georgia by focusing on how the lack of broadband access affects the areas where Kennesaw State University (KSU) students live. I visited 11 counties that had 500 or more KSU students. I measured upload and download speeds at multiple public libraries in each county. The majority of these counties had broadband access that is well below the FCC threshold of 25 Mbps download for adequate broadband. This presents an invisible barrier to education for KSU students who live in these counties, many of whom commute to school. I discovered this issue for students in Summer 2019, when a fellow student had to walk to the end of his driveway to be able to access the two-factor authentication system that KSU employs. As someone passionate about people and technology, I am concerned with how the lack of access to resources, like cellular service or Internet access at home, affects student success. Our access to the Internet is becoming more and more integral to our lives—from job applications to turning in assignments and learning new skills. Connecting the Internet to the people of Georgia is connecting the people of Georgia to the world. As of October 2019, 1.6 million Georgia residents do not have access to high speed Internet. The FCC and the State of Georgia are working on changing that. I hope my research will help.*

### ***Get Your Game On: Betting Strategies for the NFL Betting Lines***

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Jonathan Bishop

Research Mentor(s): Susan Mathews Hardy, Austin Brown

*Betting on NFL games is something that had been illegal until 2018. States are currently starting to allow it. People can bet on things such as who they think will win a game and how much a team will win by. People can also bet on whether the total points scored in a game is going to go over or under the total points that Las Vegas is predicting. NFL games are now coming to the forefront of the betting world. My research examines outdoor NFL games and whether windspeed, temperature or humidity*

*have any effects on the outcome of the game. Using loglinear regression, I sought to determine which variables predict if the score will go over or under what Las Vegas predicts. In addition, using Analysis of Variance, I researched if the total number of points both teams score in the game depends on when in the season that game was played. I followed these analyses with a nonparametric test called the Permutation Test for the Slope to examine which variables had an effect on the number of points that the team won by (Spread Favorite). Lastly, Multiple Linear Regression was used to determine if windspeed, temperature, or humidity affected the total number of points that were scored in the game by both teams. Using my results, a person will have more insight on how to bet on NFL outdoor games.*

### ***Marketing to Electric Vehicle Owners: A Win for the Environment, A Win for the Company, A Win for the Customer***

Poster Presentation - [Join now.](#)

4:00pm – 4:15pm

Undergraduate Student(s): Kara Heller

Research Mentor(s): Susan Mathews Hardy

*As a corporate analyst intern for a local electric membership corporation, I am passionate about minimizing the impact of electricity generation on the environment. To reduce peak usage of electricity, current research suggests spreading out major appliance usage and using programmable thermostats. My research focuses on predicting which customers of an electric company own electric vehicles so that the company can market time-of-use plans to these customers to encourage them to shift their vehicle charging to off-peak hours. This will reduce peak energy usage. When power generation is shifted to off-peak hours, additional higher-cost power generation facilities do not need to come online to meet peak demand, reducing the impact on the environment. In general, these additional higher-cost facilities also produce more pollution than base-load facilities. Thus, shifting power to off-peak times reduces the environmental impact, the corporation's cost for electricity, and the cost for the customers who choose the time-of-use plan. I collected data on 993 customers from the local company and used loglinear regression to predict whether a customer has an electric vehicle. I then used descriptive analysis to compute the average kilowatt hours saved if electric vehicle owners switch to time-of-use pricing. My research enables the company to estimate its savings and the customers' savings, and it enables more effective marketing. This should reduce the number of generation facilities brought online at peak hours. Identifying electric vehicle owners and marketing time-of-use plans to them creates a win for the environment, the company, and the customer.*

### ***Product Purchasing Networks for Overlapping Community Detection***

Poster Presentation - [Join now.](#)

2:45pm-3:00pm

Graduate Student(s): Christina Stradwick

Research Mentor(s): Joe DeMaio

*Research has been done in creating product purchase networks from transaction data and detecting communities of related products to reduce the number of association rules that must be investigated in market basket analysis. These networks use nodes to represent products with edges connecting nodes if the products they represent appear together in a transaction. The edges are weighted with a chosen metric concerning the importance of the rule. The same product may be related to multiple communities for different reasons, and algorithms have been developed to detect these overlapping communities in graphs. This project explores how the use of directed or undirected edges and the metric used to weight the edges in the product purchase network affect the resulting communities.*

### **Topic clustering of COVID-19 open research dataset (CORD-19) using graph clustering approach**

Poster Presentation - [Join now.](#)

3:15pm-3:30pm

Graduate Student(s): Srivatsa Mallapragada

Research Mentor(s): Joe DeMaio

*Topic clustering is an important approach in text analytics, because labeled documents are rarely available to classify documents for a specific problem. Current problem across the world is the global pandemic COVID-19 disease caused by novel coronavirus, opened up specific problems related to the COVID-19 research. A large corpus of scientific research articles were released as dataset to the world for finding best research articles to support the corona virus vaccine research. This paper utilizes the tf-idf preprocessing technique to create similarity matrix, which is used as weighted edge adjacency matrix for graph clustering. K-Means, Fuzzy C-Means were also used to compare the results with the graph clustering algorithms. The clustering efficiency is measured by inter and intra-clustering distance metrics. Decision trees are used on the clustered data to compare the clustering algorithms based on the classification accuracy. Finally, the conclusions and future directions are provided to retrieve documents specific for COVID-19 out of the entire corpus.*

### **Finding similar stocks by detecting cliques in market graphs**

Poster Presentation - [Join now.](#)

3:45pm-4:00pm

Graduate Student(s): Sudhashree Sayenju

Research Mentor(s): Joseph DeMaio

*The stock market provides an abundant source of data. However, when the amount of raw data becomes overwhelming it grows increasingly difficult to know how the stocks interact with each other. Stock data visualization as a market graph serves as one of the most popular way of summarizing important information. When modelling the data as a graph, vertices correspond to stocks and edges correspond to strong correlation in their pricing in a certain period of time. This project presents a technique to find stocks that behave very similarly. Such information helps investors make decisions on which stocks to*



*purchase next. The investors can utilize this information to select a valuable portfolio of stocks showing an increasing price trend. On the other hand, it can also help stock owners to make decisions on whether or not they should sell their stocks.*

### ***The Relationship of Delivery Method, Birth Weight and Race on Infant Mortality***

Oral Presentation - [Join now.](#)

9:30am-9:45am

Undergraduate Student(s): Anjie Adeyemo

Research Mentor(s): Michael Frankel

*Infant mortality is defined as the number of deaths per 1000 births. The U.S. infant mortality rate in 2014 was reported as 5.8 deaths per 1000 births which is very high compared to other countries such as Japan where the rate 2.1 deaths per 1000 births. The leading causes of infant death are congenital malformations, SIDS, low birthweight, pre-term births and maternal complications. For this project, I will analyze birthweight in addition to other factors related to infant death. My research aims to see how the factors of delivery method, birthweight, and race influence infant mortality to see how it can be reduced and to identify groups that are most vulnerable to experiencing high infant death rates. To evaluate this, I analyzed 2007-2016 U.S. infant mortality data from the CDC and created bar charts relating race, birthweight, and delivery method to the death rate. Also, I ran ANOVAs to find significant differences between the variables. I found out that the vaginal delivery method has the lower death rate compared to the C-section delivery method. The ANOVAs revealed that there is a significant difference between race and death rate. American Indians who were born through C-sections have the highest death rate out of all the other races and delivery methods. Small infants delivered through the C-section method are correlated with lower death rates. Large infants delivered through the vaginal method are correlated with lower death rates. I found that American Indians who were born through C-sections have the highest death rate out of all the other races and delivery methods. These results can serve as the beginning of a more comprehensive look into infant mortality.*

## **College of the Arts**

### **Music**

### ***More Than A Tree: The Effects of Clarinet Production on Tanzanian Economy***

Oral Presentation - [Join now.](#)

10:00am-10:15am

Undergraduate Student(s): Jessica Bell

Research Mentor(s): Jeffrey Yunek, Kayleen Justus

*The purpose of this project is to explore the effects of clarinet production on Tanzanian economy. Currently, the wood used to create clarinets, mpingo, is endangered. In this study, I look at the direct effects that mpingo harvesting for clarinets has on Tanzanian economy. I explore the history of clarinet and clarinet manufacturers, mpingo and its many uses among Tanzanians, the role of clarinet in Tanzania, regulation and distribution of mpingo, working conditions in Tanzania, and overall capital when it comes to mpingo. The methods I used to collect this data include a detailed literature review, traveling to Tanzania to conduct formal and informal interviews with locals, teaching and playing clarinet in Tanzanian schools, and participating in pruning and plantings of mpingo in Tanzanian communities. A direct correlation was found between pressures to harvest mpingo for clarinet production and a decrease in supply for local Makonde carvers that depend on mpingo to sustain local economies. While the harvesting of mpingo for clarinet production does bring in revenue to Tanzanian economy on a large scale, the tradeoff of possible commercial extincness is far greater — not only for Tanzanian locals but clarinetists worldwide. Some implications to solve these problems are the use of alternative materials to make clarinets, clarinet education in Tanzanian schools to connect Western classical music to African culture, and increased forest regulations and certifications in Tanzania. Ultimately, this study demonstrates the social life of mpingo as a medium with the power to generate effects musically, economically, cross-culturally and corporeally as it relates to Tanzanian locals and the future of clarinet manufacturing.*

### ***An Examination of Stress Levels and Management among Undergraduate Music Students***

Oral Presentation - [Join now.](#)

11:15am-11:30am

Undergraduate Student(s): Jeavanie Desarmes

Research Mentor(s): Nancy Conley

*Researchers have found higher levels of emotional exhaustion among music majors when compared to non-music majors, with symptoms including depression and anxiety. Research indicates that constant demand for individual practice, rehearsals, and classes may cause a sense of depersonalization, failed goals, and lack of a social life. Because of this and other factors, students enrolled in a university music program may see a higher level of burnout and fatigue. While stress and its effects are often the subject of research, there are fewer studies with university music students. This study examined the degree to which undergraduate music students indicated stress, fatigue, and burnout. Undergraduate music students at a mid-sized suburban university participated in a researcher-created survey. The participants responded to statements regarding social well-being, sleep, performances in music and academic classes, time management, exercise, and nutrition. Survey participants had the opportunity to give open-ended responses describing how they handled stress. The survey results indicated that time management, class workload, and academic and performance commitments were high stress factors among the participants. Strategies to reduce stress are proposed.*

### ***The Musical Application of Historical Literature***

Oral Presentation - [Join now.](#)

11:45am-12:00pm

Undergraduate Student(s): Yazmeen Mayes

Research Mentor(s): Laurence Sherr

*This project combines history, literature, and newly composed music. The Yellow Wallpaper, a short story by Charlotte Perkins Gilman, documents the age of “female hysteria,” a catch-all “disease” for upper-class women acting outside of the social standard. The cure: solitary confinement. Any woman that showed signs of anxiety, creative passion, lack or abundance of sexual desire, or depression was sent to a remote, empty house for months at a time. Gilman describes these houses as exuberantly plain; thus, in confinement, the main character becomes obsessed with the yellow wallpaper. At the time, these women were considered insane, but the “treatment” itself truly deteriorated their minds. I transformed this short story into a chamber opera, which I feel is the best genre to convey the fury of the narrative. After transcribing the story into lyrics for the libretto, similar to a poem, I then composed the music, incorporating tonal shifts and textures found in modern musical theatre and opera today. My composition, titled Woman in the Wall, is for string quartet, solo soprano, and mixed choir. The choir, similar to a historical Greek chorus, serves as the lens, representing the societal pressures. Though written in the 1800s, the story exposes important themes that still resonate today: classism, privilege, mental health, and gender oppression. Although we have made incredible strides, female oppression still persists: our bodies are objectified, governed, or sold, and our narratives often dismissed. Underneath the panniers and corsets, these women felt the same things we do, and through my work, I seek for their voices to be heard. During my presentation, I will play excerpts from my new composition and explain the historical and literary sources that inspired it. Overall, my project will demonstrate the utilization of academic study for social commentary in a contemporary composition for modern audiences.*

### **Theatre and Performance Studies**

#### ***How Theatre Produced by Autistic People Dismantles the Medical Model of Disability***

Oral Presentation - [Join now.](#)

9:45am-10:00am

Undergraduate Student(s): Ira Eidle

Research Mentor(s): Thomas Fish

*Autism is a neurodevelopmental disability that has a long history of being misunderstood. Said misunderstandings have led to falsehoods about autism and autistic people. The stigma surrounding autism encourages non-autistic people to see themselves as the best advocates for autism, leading to non-autistic people speaking over autistic people constantly. This has come to be known as the medical model of disability. Most autistic people do not consider autism to be a mental illness or disorder. (Kupferstein 2019) That is why when autistic people become informed on these aspects and band together, those misunderstandings can be mitigated. One such way is through the theatrical arts. My paper will examine how A\_tistic, a theatre company based out of Melbourne, Australia, uses theatre created by autistic people about autism to challenge the prevailing medical model of autism and disability that says*

*disability is caused by personal impairments and not societal barriers, people with disabilities need decisions to be made for them, and the disabled person should adjust to fit society. One such production, from their most recent season, is Helping Hands, a play that tackles stereotypes and misconceptions about autism head-on through a myriad of different scenes. By evaluating the script and interviews and reviews of the play, I will explore the problematic representations of the medical model of autism and how said model runs at the expense of autistic people. In the scene "A Very Special Girl Named Charity," a doctor gives a very common tragedy narrative found within the medical model of disability. Autism is also presented as an epidemic, which echoes the medical model. In "Donna and the Ball," Donna is put through Applied Behavior Analysis (ABA), which exists as part of the medical model, treating the disability as a pathology, while trying to make the subject appear to be less autistic. Through this research, I will illustrate how theatrical performances, like Helping Hands, can educate the world about autism from the voices of Autistic people through performance.*

## **Art and Design**

### ***3D Modeling and Scanning of Archaeological Artifacts***

Oral Presentation - [Join now.](#)

10:15am-10:30am

Undergraduate Student(s): Diana Salamaga

Research Mentor(s): Philip Kiernan

*This academic year I have been working as a research assistant to Professor Kiernan as part of the First-year research program. My work concerns a collection of ancient bronzes from the Buffalo Museum of Science, now on display in the Bentley Rare Book room at KSU. I worked with different 3D modeling software that employs photogrammetry to create printable 3D files. This included Agisoft Metashape, HP 3D Scan Pro, Mudbox, and 3D Max, etc. and obtained new skills in 3D modelling techniques of archaeological artifacts. The long-term plan is to develop a virtual museum exhibition in which my models will eventually be used. 3D images offer advantages over basic photographs of artifacts, because they allow multiple views, and give a sense of shape, from a single file. Moreover, an object in one museum can be printed in a 3D printer to create a physical reproduction of the ancient artifact anywhere in the world. This ability is an immensely valuable tool for art historians and archaeologists, as well as an interesting way of educating the public about art history and cultural heritage.*

### ***Heka Deck: Magic in Ancient Egypt & How It Has Influenced Modern Mysticism Today***

Oral Presentation - [Join now.](#)

10:30am-10:45am

Undergraduate Student(s): Nikki Raitz

Research Mentor(s): Jessica Stephenson

*Magic is a complex concept that has intrigued mankind since the beginning of time. In this interdisciplinary research project, I explore the ancient Egyptian views on magic through a lens of art*

*history, archeology, and contemporary art. This project draws on ancient Egyptian ideas about magic, known to them as Heka, and uses a selection of modern-day tarot cards as a vehicle to help illustrate their beliefs. Ancient Egyptians enjoyed a culture that did not stigmatize or demonize magic as a harmful practice like almost all other civilizations of their time. Heka, which was seen as a morally neutral magical tool, was used regularly as an important instrument for prosperity and protection amongst all members of the Egyptian kingdom. Based on surviving artifacts and structures, it has been shown that Heka was in fact so important to the ancient Egyptian culture that it is recorded as being synonymous with both their religion and their entire worldview. Claims can be made that Heka was so fundamental to Egyptian culture that it is one of the most consequential lenses through which all of their surviving artifacts should be viewed. Similar to ancient practices of Heka, tarot cards are viewed as a modern-day magical tool that are used to help guide practitioners to prosperity and away from harmful occurrences. The cards, whose modern counterparts are significantly influenced by ancient Egypt, are a collection of 78 individual, unique illustrations that are used to guide the practitioner through what is considered to be the complete collection of possible human experiences or universal archetypes. By viewing a selection of modern tarot cards that are informed by ancient Egyptian ideas about magic, I seek to connect the universal archetypes of the cards with the Ancient Egyptian Worldview. These cards which are informed by Heka become a means of connecting ancient world ideology with modern perceptions on magic and connect art history with contemporary art.*

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

### **Civil and Construction Engineering**

#### ***Analysis and Characterization of Microplastics in Water Treatment Plants***

Poster Presentation - [Join now.](#)

4:00pm-4:15pm

Undergraduate Student(s): Skylar Rose

Research Mentor(s): Amy Gruss, Marina Koether

*Plastic pollution is a growing public concern due to its effect on our environment and oceans. Based on the increasing prevalence of microplastics in the environment, they are now present in potable water. Microplastics can be defined as pieces of synthetic polymers that can typically be measured to be smaller than five millimeters. Microplastics can stem from sources such as beauty products containing microbeads, polystyrene foam packaging, and the deterioration of disposable plastic items. Much of this waste enters natural water bodies, which is the source of our drinking water. Little is known about the microplastics contaminating our water treatment facilities (Olabode & Dhanasekar, 2019). It is believed that current treatment technology at water and wastewater treatment plants do not easily remove*



microplastics. This lack of treatability allows the microplastics to return to bodies of water, and even drinking water. Achieving the creation of a monitoring program would allow for better clarification of how microplastics can be removed from our water systems. However, this would require the establishment of standardized methods and guidelines – there is still a research gap in developing these methods. Currently there is no standard for microplastic sampling and analysis in engineered systems, such as water and wastewater treatment plants. The National Oceanic and Atmospheric Association (NOAA) has created methods for sampling using ocean water, which we will try and implement with the water and sludge byproduct samples in order to develop methods that could be used within the treatment plants (NOAA, 2015). Characterization of microplastics is also necessary in order to better understand the source of pollution and aid in the prevention of it from entering our drinking water. This research is crucial in filling a gap in the literature on how to analyze and characterize microplastics at treatment plants in order to protect public health.

### ***Using Comprehensive Finite Element Analysis to Simulate A Special Connection in Post-Tensioned Concrete***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Joshua Leljedal

Research Mentor(s): Mohammad Jonaidi

Finite element analysis (FEA) uses differential equations to determine a computer-based solution that explains interactive behaviors within models of complex structural and mechanical systems, subjected to various loading and environmental conditions. Those systems are partitioned into finite elements consisting of a linear mesh with nodes at each end point, and FEA determines relationships, such as force-displacement, between each of the finite elements. This apportioned model allows systems to be evaluated under multiple loading scenarios. Computer-based FEA offers significant benefits that reduce cost and the time required to perform alternative analysis for complex structural systems. In this research project, a comprehensive FEA program called ABAQUS/CAE is utilized to model non-linear time dependent loading, and to validate strength and deformation of small-scale structural prototypes created in the laboratory. Understanding the FEA process from this research will allow larger-scale structural systems to be iteratively modeled and analyzed with ABAQUS, rather than building costly prototypes in a laboratory. This will reduce time and costs required to conduct additional research. A specific goal of this research is to use FEA to model the interaction of a permanent release connection between concrete walls and post-tensioned concrete slabs under various loading conditions. Modeling this interface of vertical dowels wrapped with compressible material is expected to show temporary or permanent release of the slab from the restraint of the walls, thereby mitigating cracking. This behavior is of particular interest to contractors involved with construction of large structures, such as bridges and high-rise buildings in metro Atlanta.

### ***A Special Slab-Wall Connection in Post-Tensioned Concrete***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Undergraduate Student(s): Gehu Bautista Santiago

Research Mentor(s): Mohammad Jonaidi

*Post tensioned concrete is a widely used method in the construction of the slab of high-rise buildings, podium (transferred) slab of wood-framed structures, bridges and so on. The effects of slab shortening due to concrete shrinkage and post-tensioning compression should be considered in the design of the structure. Various connections, between slab and wall, are used in the industry. However, the behavior of a special connection which consists of steel reinforcement dowels wrapped with compressible material has not been investigated. This research study investigates a case that requires a permanent slip detail in which the dowel between the shear wall and slab is wrapped with a compressible foam in different conditions. A unique testing rig has been established at the Kennesaw State University (KSU) Marietta Campus to apply lateral load to the poured concrete specimens that contain the foam-wrapped steel dowel (rebar), which extends into a poured concrete slab. A set of experiment was performed using a hydraulic jack, and load and displacement sensors. In the first specimen, both vertical and horizontal part of the rebar were wrapped. The result indicated that the wrapped bars still provide nearly 9,000-lb resistance before the 1-inch gap is closed. The specimen resisted a maximum of approximately 15 kips force ultimately. In the second specimen, the horizontal (hook part) of the reinforcement was unwrapped, allowing a bond between concrete and steel. The connection in this specimen behaved considerably different than the connection of the first set. The specimen resisted a maximum of approximately 39 kips. This reveals a remarkable aspect of this connection type. Further experiments are required, and planned, to be carried out to fully investigate and analyze this phenomenon.*

## **Electrical Engineering**

### ***Wireless Power Receiver with Tripler Circuit, Boost Converter and Supercapacitor***

Poster Presentation - [Join now.](#)

10:30pm-10:45pm

Undergraduate Student(s): Bradley Clayton

Research Mentor(s): Bill Diong

*This presentation lays out the groundwork, advancements, and results of a three-stage wireless power receiver with the purpose of providing power to low-power electronic equipment that operate at 5V. The receiver incorporates an impedance matching network, a tripler circuit, a boost converter, and a super capacitor. The impedance matching network has been designed for 1GHz but through testing the receiver with a signal generator followed by an antenna, it has been found that the signal frequency of 996MHz yields optimal energy capture at the tested received power levels of 0dBm, 3dBm, and 6dBm. The signal is produced from a signal generator which sends power to the transmitting antenna, then wirelessly to the receiving antenna that is connected to the wireless power receiver, and the voltage boosted to charge the energy storage supercapacitor. With the optimal settings in place the system would be able to substitute for the wires powering low-voltage devices on aircraft, reducing the weight on board*

*and allowing for these devices to be powered with radio frequency (RF) signals. This would save fuel and reduce carbon emission, thereby helping to slow climate change.*

### **LoRa Wake-up Radio Relay with BeagleBone Black**

Oral Presentation - [Join now.](#)

9:45pm-10:00am

Undergraduate Student(s): Andrew Hopkins

Research Mentor(s): Sumit Chakravarty

*This project investigates the use of BeagleBone Black Wireless single-board Linux computers with Long Range (LoRa) transceivers to send and receive information while using a relay in the system. Three experiments are conducted. The first is conducted by maintaining the size of the payload and the distance between LoRa transceivers. The spread factor, bandwidth, coding rate, and output power are all varied. The second experiment has the LoRa relay system listening to the transmissions between two LoRa transceivers and only transmitting if the received signal is less than a certain strength level. The third experiment combines the LoRa relay system with a wake-up radio, optimizing power utilization. The LoRa relay learns the transmission interval and goes to sleep in between transmissions. Python code, data from the experiment, and conclusions are provided.*

## **Electrical and Computer Engineering Technology**

### **Long Distance Li-Fi**

Poster Presentation - [Join now.](#)

4:15pm-4:30pm

Undergraduate Student(s): Adeyemi Fagbemi

Research Mentor(s): Billy Kihei

*Wi-Fi has been in existence since 1998 providing an increase in the amount of data transmitted and generated by machines. With the growing market demand for network bandwidth, it will make it nearly impossible for typical radio frequency (RF) technologies like Wi-Fi to supply the resources needed for the data transmission. As a complementary solution, Li-Fi was introduced in 2011 as a method of data transfer through the use of light sources. Li-Fi employs the use of visible light spectrum which has 1000 more times the bandwidth of typical RF spectrums. This study investigates the distance to which this method of data transmission can be done on a simple Li-Fi transmission system. We use a basic LED to send signals to a photoresistor exploring the basis of using different lenses to further increase the distance of reception. In lab observations indicate that data transmission occurs after the light source was made to pass through different lenses. The result of this can be used as a starting point to determine how far a Li-Fi data packet can be sniffed without loss of packet information and increasing the distance of transmission.*

### **Motion Detection on a Frequency Jumping RFID Signal Using Machine Learning**

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Trevor Stanca

Research Mentor(s): Billy Kihei

*Radio Frequency Identification (RFID) is a well-known technology in wireless communication. It is hypothesized that the capabilities of RFID can be extended by reading an ID number and detecting movement around the reader during the read. Following regulatory standards, this study presents the foundation for a software defined RFID reader that may simultaneously detects and classifies the type of movement during the interrogation operation. A frequency hopping signal in unlicensed 5.8GHz can be analyzed using machine learning to extract a Doppler profile. We effectively collect information about an object through RFID by potentially detecting the speed of the object or classifying its size. This innovation could positively impact multiple industries. A few applications for this technology include: robust security mechanisms for RFID readers enabling reliable supply chains, ticketing speeding cars in the electronic toll lanes to enable safer roads, and enabling safer warehouses such that forklifts equipped with our RFID Doppler reader technology could detect human movement during inventory tracking.*

### ***Novel Vehicle-to-Everything Rollover Antenna***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

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

Research Mentor(s): Billy Kihei

*Soft robotics is a new field of engineering ready to be explored, because of its use of unconventional materials it can withstand copious amounts of stress which makes it ideal for applications involving vehicular accidents. In this groundbreaking work, we attempt to integrate soft robotics technologies with Vehicle-to-Everything (V2X) communications. Specifically, we introduce the preliminary planning stages for creating a novel V2X rollover antenna that can reduce road deaths and provide more reliable accident data. An up-right roof-mounted antenna could be damaged during a roll-over accident thereby severely limiting the V2X radio from providing reliable warning signals to other V2X equipped vehicles or infrastructure. Our proposed soft robotic V2X antenna will deploy from beneath the car using pneumatic actuation and extend up until it is able to send a reliable signal. To the best of our knowledge, this is the first attempt within the literature to address a rollover accident use-case for V2X communications.*

### ***Detecting Primitive Jamming Attacks using Machine Learning in Vehicle-to-Everything Networks***

Poster Presentation - [Join now.](#)

2:30pm-2:45pm

Undergraduate Student(s): Hakeem Wilson

Research Mentor(s): Billy Kihei

*Vehicle-to-Everything communications (V2X) is gaining additional ground as an upcoming ad hoc safety network. In V2X, basic safety messages are used for exchanging critical information between vehicles at a set broadcast rate. However, jamming attacks on the safety spectrum could deny V2X radios the ability to save lives on the roadway. This preliminary work analyzes two types of primitive jamming attacks performed on target V2X devices. Lab results reveal that V2X networks are easily susceptible to jamming attacks, due to all V2X standards lacking a requirement to detect/mitigate jamming. To avert this threat and promote safety of life on the roadways, we demonstrate a supervised machine learning model implemented at the baseband chipset could detect and classify the type of jamming attack with outstanding stability and an accuracy of 99.84%.*

### ***Design and Test of Novel Vehicle-to-Everything Packet for Sensor Arrays in Under Roadway Deployment***

Poster Presentation - [Join now.](#)

3:00pm-3:15pm

Undergraduate Student(s): Marquis Brown, Hakeem Wilson

Research Mentor(s): Billy Kihei

*Vehicle-to-Everything (V2X) communications is a burgeoning technology that will enable safer, greener, and more productive usage of roadways. In the V2X paradigm, all equipped vehicles and infrastructure can communicate with each other in real-time. By utilizing V2X communications as an Internet-of-Things gateway, a sensor array installed under roadways, allows real-time monitoring of road conditions which increases overall road safety and road maintenance cost. In our research, we have utilized the WAVE Short Message Protocol (WSMP) as the means of communication between roadway sensors and roadside gateways. We implemented the first proof-of-concept using this protocol, with a single-board computer to format sensor information into a WSMP packet and send this information via radio transmission across multiple hops to V2X gateway which can then relay the road temperature information to a remote server. We envision the packet format to be all purpose-built for V2X communication, making it the optimal choice for networking transportation information.*

### ***Securing Global Positioning Systems in a Blockchain using Vehicle-to-Everything Communications***

Poster Presentation - [Join now.](#)

3:30pm-3:45pm

Undergraduate Student(s): Malik Purefoy

Research Mentor(s): Billy Kihei

*Intelligent transportation systems (ITS) are being deployed globally to support vehicular safety innovation using wireless communication. The ITS paradigm of vehicle-to-everything communication (V2X) enables vehicles equipped with an on-board unit (OBU) to communicate with a roadside unit (RSU) infrastructure to provide safe intersection movements between similarly equipped vehicles,*



pedestrians, and animal life. However, the current paradigm relies heavily on the availability of a Global Positioning System (GPS) for ensuring road user safety. In a doomsday scenario where GPS becomes unavailable, collision avoidance services provided through V2X may be rendered unavailable. The proposed solution is to develop a secure and reliable method for V2X nodes to reliably request positioning information from RSUs. The advantages are two-fold: when GPS is offline V2X nodes can continue to receive positioning information for safety applications, and when GPS is online V2X positioning information could be corrected/improved through ground truth positioning verification.

## **Mechanical Engineering**

### ***Atomistic Simulation of Desalination***

Oral Presentation - [Join now.](#)

10:00am – 10:15am

Undergraduate Student(s): Ian David Durr, Matheus Prates

Research Mentor(s): Jungkyu (Justin) Park

*In this research, we investigate the desalination capacity of three-dimensional (3D) carbon nanostructures using molecular dynamics simulations. 3D carbon nanostructures proposed here will filter seawater efficiently because of their multiple layers with holes of tunable sizes. The structure is designed to be flexible, allowing mechanical deformation during daily use. The 3D carbon nanostructure will still possess high thermal conductivity, enabling easy recycle through a simple heating process. Here, we employ LAMMPS, Large-scale Atomic/Molecular Massively Parallel Simulator distributed by Sandia National Laboratories to measure salt ion flux through 3D carbon nanostructure membrane. Pillared graphene structures (which is consisted of graphene floors and carbon nanotube (CNT) pillars) are selected as the representative 3D carbon nanostructure. An initial 3D carbon nanostructure was constructed using custom MATLAB program. The solvation and ionization of a 3D carbon nanostructure were accomplished by using Visual Molecular Dynamics (VMD); ions of sodium (Na<sup>+</sup>) and ions of choline (Cl<sup>-</sup>) were placed into solution to simulate saltwater. Combined Airebo and TIP4P force field was used to define interatomic potential between atoms. During the simulation, it was observed that water molecules passed through CNT pillars that connect graphene floors efficiently while salt ions were blocked because of the limited diameter of CNT pillars. The results obtained in the present research will accelerate the development of more efficient and environmentally friendly solution for the desalination of seawater.*

### ***Reusable Nanostructured Carbon Seawater***

Oral Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Ian Durr, Matheus Prates

Research Mentor(s): Jungkyu (Justin) Park

*In this study, our group will be researching carbon nanostructures and how effective the material can be at filtering seawater. Hydrophobic carbon nanotubes and graphene are known to be excellent material to desalinate seawater. Any organic material inside the water would adhere to carbon material effectively and would only allow clean water molecules to flow through. Carbon nanomaterial can be very efficient with its high melting point of 3000°C and utilize heating methods to evaporate any micro-contaminants remaining in the system. The material is also durable and will retain its original structure during the heating process due to its heat treatment and will furthermore remove any contaminants during long usages. The research will be conducted by using atomistic simulations that will allow us to analyze different behaviors of the material as well as how efficient it can desalinate saltwater through higher temperatures. The material's recovery of carbon-carbon bonds at high temperatures will also be analyzed through atomistic simulations. The changes in temperature will allow us to study how efficient carbon-based nanomaterials will be with different temperatures, as well as alter the carbon structure of the filter to further improve its success rate. The world faces a struggle with water scarcity and carbon nanostructures promises a hopeful solution to resolve such crisis with its highly efficient and recyclable characteristic.*

### **Trajectory Control of Planar Closed Chain Fully Compliant Mechanism**

Oral Presentation - [Join now.](#)

10:15am-10:30am

Undergraduate Student(s): Martin Garcia

Research Mentor(s): Ayse Tekes

*This study presents the design, analysis, dynamical modeling and control of a planar, flexure based closed chain compliant mechanism. Mechanism is designed as a single piece and comprised of rigid-flexure links connected in series. Base links of the mechanism can be actuated through two servo motors and translated along the horizontal direction using two step motors. Two servo motors are mounted on a rail-cart system and carts are equipped with belt drive to enable horizontal displacement. Dynamical model of the mechanism is derived by adapting pseudo rigid body modeling method, vector closure loop equations, Euler's Laws of Motion and geometric constraints. Mechanism is 3D printed using thermoplastic polyurethane filament (TPU), motion of the mechanism is video recorded and position of the tip along with the motion of center of each links are captured using image processing. Mathematical model is simulated in Matlab Simulink and validated with the experimental data. A reference trajectory drawn within the workspace of the mechanism on iPad is successfully traced in real time using the simplified model, mirror imaging program and inverse kinematics.*

### **Bio-Inspired Monolithically Designed Compliant Swimming Robots**

Oral Presentation - [Join now.](#)

9:30am-9:45am

Undergraduate Student(s): Joshua Hooper

Research Mentor(s): Ayse Tekes

*As technology advances and enables us to design and realize complex systems using new materials and manufacturing methods, biologically inspired robots in every aspect of engineering have attracted much attention in the last few decades. This paper presents the design and analysis of monolithically designed two compliant swimming robots that are actuated and controlled by single motor. Each design incorporates large deflecting compliant members and rigid levers to transfer the input torque to the different parts of the robot. While the first design integrates flexible tail to perform swimming motion, the second design adopts snapping type motion for the same action. Both mechanisms are 3D printed and tested for forward motion. The first robot has a constant speed of 0.68 BL/s while the second has an average speed of 0.6 BL/s. Kinematic model using pseudo rigid body modeling (PRBM) is derived to calculate the load-deflection curves of the flexible tail for Design I, finite element analysis for deflection analysis are performed for Design II.*

### **Modeling of Compliant Mechanisms in MATLAB Simscape**

Oral Presentation - [Join now.](#)

9:45am-10:00am

Undergraduate Student(s): Paul Pena

Research Mentor(s): Ayse Tekes

*Compliant mechanisms have received considerable amount of interest in the design of systems having bistable behavior, following a dwell motion, impact motion as well as bio-inspired mechanisms. As technology advances it brings the opportunity to manufacture compliant mechanisms using additive manufacturing with new materials. Compliant mechanisms incorporating flexible links and flexure segments creates motion through the deflection of its flexible links rather than the relative motion between two links as appear in traditionally designed rigid mechanisms. They provide several advantages such as fewer number of links required to build the mechanisms, no friction, no backlash and high precision and high performance compared to their rigid-body counterparts. Despite the advantages, modeling and design of compliant mechanisms are challenging, and require design and modeling experience. Finite element method provides an accurate solution considering the material nonlinearities. Common modeling methods such as Elliptic integral solution and pseudo rigid body modeling is applicable to simple flexible link geometries such as fixed-fixed, pinned-pinned and small length flexure hinges. If the complexity in the design increases, as expected deriving the mathematical model of compliant mechanism becomes more challenging. This paper presents the informative process of modeling of compliant mechanisms using MATLAB Simscape. Simscape is the modeling environment analyzing both rigid and flexible systems using either the blocks provided in the library or the CAD models imported from modeling software. We present the modeling of four compliant mechanisms: dwell, five bar, translational and hopping mechanisms. Once the cad model of a system is imported into Simscape, the flexible links or flexure segment on each example system is replaced by its equivalent lumped parameter block. Compliant dwell mechanism is comprised of a rail, two pinned-pinned flexible links, slider, rigid crank and a DC motor. The second mechanism is a fully compliant five bar mechanism incorporating large deflecting flexures and actuated by two servo motors. The objective is to*

control the trajectory of the tip position. Third example models a bio-inspired translational compliant mechanism driven by servo motors and comprised of three sliders connected by single piece designed 2 rigid arm-flexure hinge linkages mimicking the motion of a caterpillar. The last example is the modeling of a compliant hopping robot consisting of two pairs of gears; one pair is attached to the motor and the other pair allows the bottom links to rotate at same angular velocity in opposite directions. Rigid and flexible links on each example system are 3D printed using polylactic acid (PLA) and polyethylene terephthalate glycol (PETG) filaments. MATLAB Simscape modeling outputs are validated through experimental setups for each system.

### **Design and Development of a Robotic Compliant Knee Joint**

Oral Presentation - [Join now.](#)

10:00am-10:15am

Undergraduate Student(s): Ciaphus Rouse, Myles Williams, Kiera Elston

Graduate Students: Trevor Warnix

Research Mentor(s): Ayse Tekes

Lower extremity loss or impairment which challenges the mobility of the people is caused by many reasons such as diabetes, stroke, spinal cord injury and ageing. Recently, there has been a huge demand for assistive knee devices which improve the quality of the people who have lower limb disorders. These devices are commonly called as exoskeletons which are wearable prosthetic robots that couples with human body and augment and restore human performance during motion. Robotic prosthetic based systems are widely used in assistance and rehabilitation of patients with permanent or temporary dysfunctionality providing complete or partial replacement of related limbs. Knee joint is the most important part of human lower limb prosthesis which provides healthy locomotion and is responsible to enable smooth control of a stable gait. The knee is a complicated structure consisted of a number of important ligaments, bones tendons and muscles and it is one of the most stressed joints in the body. On the other hand, walking action is a combination of complex set of movements which makes it extremely difficult to model the exact human walking. There have been several prosthetic systems developed to mimic the natural muscle actions that act like the knee joint. Single axis prosthesis provides a one degree of freedom motion that can bend around a fixed center of rotation. Although these early prostheses are easy to implement and relatively cheaper, they do not provide high stability and hence the amputee must depend on his own muscle control. Single axis prosthesis are commonly used by children and patients who need walking assistance. Most of the single axis and polycentric based knee prosthesis are passive devices integrating hydraulic or pneumatic controllers allowing the knee to adjust walking speed. On the other hand, there have been recently developed microcontroller based active knee devices utilizing various sensors and motorized mechanisms with complex control algorithms. Although these active devices have better gait stability applying controlled external power and healthy knee behavior with reduced fall risk of the amputee, they are expensive, heavy and need large amount of energy to operate. In general, currently available knee prosthesis designs include several metal parts such as motors, gears and springs which makes the system extremely bulky not allowing small children to use them comfortably. In addition, since the knee prosthesis had a fixed size and very limited adjusting capability,

*it is always a challenge for the children who are still in growing stage. Therefore, for pediatric applications, it is desired to have cheap, light-weighted and easily replaceable prosthesis devices which would also provide flexible motion. Compliant mechanisms are good candidates offering many advantages including lighter weight, easy and cheap manufacturing process, monolithic design and reduced friction which makes them potentially suitable for pediatric prosthesis knee systems. In this study we present the design of a monolithic, compliant and 3D printed knee joint that is low-cost and simple designed to replace the existing bulky and rigid knee joints. The forward motion and snapping to complete a successful walking gait are achieved by the large deflection of flexure hinges. Knee joint performance is tested on a robotic knee.*

### ***Development of Passively Adaptive Wire Actuated Monolithic and Distributed Compliance Gripper Positioned by Robot Manipulator***

Oral Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Rafael Barreto Gutierrez, Martin Garcia, Joan McDuffie, Courtney Long

Research Mentor(s): Ayse Tekes

*This paper presents the design and development of a two fingered, monolithically designed compliant gripper mounted on a two-link robot. Rigid grippers traditionally designed by rigid links and joints might have low precision due to the friction and backlash. The proposed gripper is designed as a single piece compliant mechanism consisted of several flexible links and attached to a two-link arm robot driven by two step motors. The compliant gripper is actuated by wires through a dc motor to enable grasping objects in various shapes. Input-output motion of the gripper along with the two-link robot is created by integrating the pseudo rigid body modeling (PRBM), vector closure-loop equations, geometric constraints, Newtonian dynamics and finite element analysis. Experimental testing for grasping various objects having different sizes, shapes and weights are carried out to verify the robust performance of the proposed design.*

### ***Design of a Compliant Based Biomimetic Planar Locomotive Mechanism***

Oral Presentation - [Join now.](#)

10:30am-10:45am

Undergraduate Student(s): Dillon Loupe, Hanseul Kim

Research Mentor(s): Ayse Tekes, Coskun Tekes

*This paper presents the design, development, modeling and control of a biomimetic multi degree of freedom compliant locomotive mechanism that can follow a prescribed trajectory. Locomotive motion in nature is achieved by the peristaltic movement of body segments of crawling animals or the legged motion by completing a gait cycle. Compliant mechanisms transfer the input displacement, force or torque from one point to another point through the large deformation of its flexible links or hinges as same approach is implemented in nature. Since compliant mechanisms can be designed as a single piece,*



*it reduces the number of parts required to build the system, reduces the friction, increases performance and accuracy. A compliant mechanism incorporates either a flexible link or flexure hinge to achieve desired output motion. Flexure hinges replaces the revolute joints and provides more degrees of freedom compared to conventionally designed rigid body mechanisms. If the flexural pivot is so small compared to the connected rigid body segments, then the flexure is assumed to be small length flexure. The research objective of this study is the design of a high mobility and flexible planar locomotive mechanism incorporating large deflecting compliant hinges. The actuation is realized using both servo motors and contactless electromagnetic forces. Mechanism is consisted of five sliding carts, rail, 3D-printed supplementary pieces to house motors and pins. Carts are connected by monolithically designed two arm links joined by a large deflecting flexure. Four servo motors are mounted on both ends of the machanism. Since sliding carts are identical, forward motion is achieved by changing the friction of carts through the connecting pins. Dynamical model is created in Matlab Simulink using D'Alembert's principle, pseudo rigid body modeling (PRBM), vector closure-loop equations and kinematic constraints. To robustly control the position of the mechanism, first its nonlinear dynamics replaced with a family of linear time invariant systems which have parameter uncertainty. Then a robust controller is designed based on the Quantitative Feedback Theory (QFT) for the desired robust tracking and stability bounds. QFT is one of the most powerful robust control techniques which can take into account both phase and magnitude information of the system and enables the designer to minimize the cost of feedback by clearly observing the design constraints through robust performance bounds. Finally, the performance of the designed controller is validated though nonlinear simulations using the nonlinear dynamics of the mechanism. It has been shown that the mechanism can consistently track the desired inputs both in frequency and time domains.*

## **Systems and Industrial Engineering**

### ***Blade Optimization for Ground Level Low Speed Wind Turbines***

Oral Presentation - [Join now.](#)

11:00am-11:15am

Undergraduate Student(s): Ryan Foster

Research Mentor(s): Adeel Khalid

*Low speed wind turbines can provide inexpensive and clean energy in areas where large scale wind power generation is impractical. The purpose of this research is to explore factors that affect the efficiency of low speed wind turbine blades. The factors that were tested include angle of attack, angle of twist, chord length, average thickness, span, and taper ratio. The goal is to determine a combination of these variables to enable maximum power extraction from a low wind speed source. These blade parameters are optimized for the Southeastern region of the United States. NOAA weather data at ground level are used to determine average wind speeds. The optimized wind turbine will be suitable for residential or small commercial uses. Testing is done using an analytical physics-based model and Computational Fluid Dynamics (CFD). Future testing on 3D printed blades will be done to validate the accuracy of the analytical physics-based model and Computational Fluid Dynamics testing.*

# WellStar College of Health and Human Services

## Exercise Science and Sport Management

### *The Association Between Caffeine and Insulin Sensitivity in Non-Diabetic Young Women*

Poster Presentation - [Join now.](#)

1:45pm-2:00pm

Undergraduate Student(s): Raine Morris

Research Mentor(s): Katherine Ingram, Janeen Amason

**Introduction:** *Insulin sensitivity refers to how the body cells respond to the hormone insulin and is affected by several factors such as physical activity and body composition. Recent research studies have identified relationships between insulin sensitivity and intake of caffeine, a popular stimulant. While the mechanism by which it affects insulin sensitivity is unknown, there are some studies that show a positive relationship between insulin sensitivity and caffeine intake and others that show a negative relationship. More research is needed to fully identify the association between the two in order to understand the mechanism completely.* **Purpose:** *The purpose of this study is to examine the association between the intake of caffeine and insulin sensitivity.* **Methods:** *38 non-diabetic women completed the study (Age,  $20.7 \pm 2.8$  years; BMI  $27.6 \pm 3.6$ ). Diet was self-reported using the Automated Self-Administered 24-hour (ASA 24) questionnaire. Matsuda Insulin Sensitivity Index was calculated using the plasma glucose and plasma insulin results from a 2-hour OGTT with blood samples taken at 0, 30, 60, and 90 minutes. SPSS will be used to analyze the relationship between caffeine and insulin sensitivity with correlation and regression statistics.* **Results:** *The results will be presented at the 2020 KSU Symposium of Student Scholars.*

### *Gestational Diabetes: What About Your Exercise?*

Poster Presentation - [Join now.](#)

2:15pm-2:30pm

Undergraduate Student(s): Andreana Henry

Research Mentor(s): Katherine Ingram

*Previous research on exercise as a form of preventative care to reduce the risk of gestational diabetes has produced conflicting views. Our current research will evaluate whether exercise frequency during pregnancy is linked to the likelihood of experiencing gestational diabetes. Participants in this postpartum study will complete a MAMA survey, conducted with Qualtrics. The participants will use a Likert scale to answer questions about their frequency of exercise and the presence or absence of gestational diabetes during their pregnancy within the last two years. The MAMA survey will compare the frequency of exercise during their pregnancy as well as the percent of women who reported having*

gestational diabetes with the intention of evaluating their statistical relationship. This survey will collect data until April 10, 2020 and present the findings at the student symposium.

### ***Sex Differences in Plantar Flexor Strength and Contractile Properties after Isometric and Dynamic Fatigue***

Oral Presentation - [Join now.](#)

10:00am-10:15am

Graduate Student(s): Phuong L. Ha, Benjamin E. Dalton, Michaela G. Alesi

Undergraduate Student(s): Tyler M. Smith, Anna G. Conroy

Research Mentor(s): Garrett M. Hester, Trisha A. VanDusseldorp, Yuri Feito

**Purpose:** To determine sex differences in strength and contractile properties after isometric and dynamic fatiguing exercise of the plantar flexors. **Methods:** Recreationally active males ( $n=13$ , age= $22.4\pm2.2$  yrs) and females ( $n=15$ , age= $20.9\pm2.4$  yrs) performed a maximal isometric (2 min) and isotonic (120 reps at 30% peak torque) fatigue task on 2 separate visits. Before and after each fatigue task, participants performed a 3 sec maximal voluntary isometric contraction (MVIC) with tibial nerve stimulation being delivered during and immediately after the MVIC. Peak torque (PT; highest 250 ms) was obtained during the voluntary phase of the MVIC. Peak twitch torque ( $T_{TQ}$ ), rate of torque development (RTD;  $\Delta\text{torque}/\Delta\text{time}$ ), and half relaxation time (HRT; time for  $T_{TQ}$  to decrease from peak to 50%) were calculated from the resting twitch after the MVIC. Voluntary activation (VA%; ability of the muscle to be fully activated) was calculated using a corrected interpolated twitch formula. Three-way (condition  $\times$  sex  $\times$  time) repeated measures ANOVAs were used for analysis. **Results:** Regardless of sex or condition,  $T_{TQ}$  (-23.1%), RTD (-12.6%), HRT (+22.9%) were changed after fatigue ( $p<0.05$ ), while VA% remained unchanged ( $p>0.05$ ). Regardless of condition, PT was more reduced in males (-22.5%) compared to females (-19.2%) ( $p=0.017$ ). **Conclusions:** Our findings indicate that the fatigue-induced decrease in strength was greater in males than females. While our findings do not identify the contributing physiological mechanism(s), changes at the peripheral level may be responsible.

### ***Chair Rise Kinetics and Correlates of Performance in Young and Older Males***

Oral Presentation - [Join now.](#)

10:45am-11:00am

Undergraduate Student(s): Tyler Smith

Graduate Student(s): Phuong Ha, Alex Olmos, Matthew Stratton, Alyssa Bailly, Micah Poisal, Joshua Jones, and Benjamin Dalton

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

**Purpose:** To compare chair rise kinetics in young (YM) and older (OM) males, and determine correlates of chair rise performance. **METHODS:** YM ( $n=15$ , age= $20.7\pm2.2$  yrs) and OM ( $n=15$ , age= $71.6\pm3.9$  yrs) performed three trials of a single chair rise as quickly as possible on a force plate and the vertical ground reaction force (VGRF) signal was analyzed. Peak VGRF (PF), as well as peak (100 ms rolling average), early (minimum VGRF to 50% PF), late (50% PF to PF), and overall (minimum

VGRF to PF) rate of force development (RFD;  $\Delta\text{force}/\Delta\text{time}$ ) were calculated based on phases of the task. Power and velocity parameters as well as quadriceps rate of electromyography rise (RER) were also obtained. Independent samples t-tests were used for age comparisons, and Pearson correlation coefficients were calculated for each group to examine select relationships. **RESULTS:** Chair rise time, average power, early RFD, and leg lean mass were similar between groups ( $p>0.05$ ). All other power, velocity, RFD, and RER measures were lower in OM ( $p<0.05$ ). PF and all RFD measures, except late RFD, were strongly correlated with chair rise performance in OM, while PF and peak RFD were only moderately correlated with performance in YM. **CONCLUSIONS:** As expected, most kinetic variables were diminished in OM, but our data indicate that average power and early RFD are not sensitive to age. Further, PF and RFD are more associated with chair rise time and power in OM compared to YM, yet neither lower-body lean mass nor rapid muscle activation are influential.

### ***Two Models for Assessment of Body Composition during Pregnancy and Their Associations with Insulin Resistance***

Poster Presentation - [Join now.](#)

2:45pm-3:00pm

Undergraduate Student(s): Ami Eho, Calah Coleman

Research Mentor(s): Katherine Ingram, Janeen Amason

**Introduction:** High levels of body fat are associated with cardiometabolic conditions, like insulin resistance, a precursor to diabetes. It is challenging to study these associations in pregnancy because body water levels fluctuate widely. The best known formula—the four-compartment model (4CM)—is unsuitable to use during pregnancy because it requires bone mineral content (BMC) from dual-energy x-ray absorptiometry (DEXA), which can only be used postpartum because of radiation exposure. **Objective:** This study compares the associations between two formulas used to measure body fat content (a 4CM and a two compartment model (2CM) that does not require BMC) and insulin resistance during pregnancy. **Methods:** At 20 weeks gestation, 33 pregnant women (73.1% white, aged  $27.6\pm4.2$  years, BMI  $27.6\pm6.3$ ) received body composition measures: body density (BD) via air displacement plethysmography (BodPod) and total body water (TBW) via bioelectrical impedance (InBody 720). Bone mineral content (BMC) was measured post-partum using DEXA. Body fat was calculated by 4CM (Selinger:  $[(2.747/\text{BD}) - .714(\text{TBW}/\text{wght}) + 1.129(\text{BMC}/\text{wght}) - 2.037] \times 100$ ) and 2CM (Van Raaij:  $\text{Wght} - (\text{TBW}/0.732)$ ). Insulin resistance was calculated by the Homeostasis Model Assessment of Insulin Resistance ( $\text{HOMA-IR} = \text{fasting insulin (mU/L)} \times \text{fasting glucose (mg/dL)} / 405$ ) measured from fasting blood measures collected at 24-26 weeks gestation. Correlation analyses were used to assess relationships among the two body composition models and HOMA-IR. **Results:** The mean percent body fat was  $40.5 \pm 7.1\%$  using 4CM and  $38.7 \pm 7.3\%$  using 2CM. Both formulas were in close agreement with one another ( $r=.970$ ,  $p<.001$ ). HOMA-IR was strongly correlated to both 4CM ( $r=.524$ ,  $p=.009$ ) and 2CM ( $r=.547$ ,  $p=.006$ ). **Conclusion:** The results indicate that estimating body composition using a 2CM would be an appropriate substitute for a 4CM in pregnant women.

## **FATIGUE-INDUCED SEX DIFFERENCES FOR EXPLOSIVE NEUROMUSCULAR CHARACTERISTICS OF THE PLANTAR FLEXORS**

Poster Presentation - [Join now.](#)

3:15pm-3:30pm

Graduate Student(s): Ben Dalton, Phuong Ha, Michaela Alesi

Undergraduate Student(s): Tyler Smith, Anna Conroy

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

*Previous research on fatigue using isometric contractions suggests that females are more fatigue resistant than males, but less is clear regarding fatigue induced by dynamic contractions. **PURPOSE:** To determine sex differences for explosive voluntary neuromuscular characteristics of the plantar flexors (PFs) during a dynamic fatiguing task. **METHODS:** Recreationally active males ( $n=14$ ;  $22.4 \pm 2.2$  yrs) and females ( $n=15$ ;  $20.9 \pm 2.5$  yrs) performed a fatiguing task of the PFs consisting of 60 maximal isotonic contractions at 30% of their maximal isometric strength using a dynamometer. Peak power (PP), optimal velocity (OV), and optimal torque (OT) were calculated from the first five contractions of the fatigue task and five maximal isotonic contractions performed after the fatigue task. Power was calculated as the product of angular velocity and torque and PP was recorded. In addition, velocity and torque at the moment in time PP occurred were recorded as OV and OT, respectively. Rate of electromyography rise for the medial gastrocnemius ( $RER_{MG}$ ) and soleus ( $RER_{SOL}$ ) was calculated as the linear slope of the normalized electromyography-time curve. Two-way (time  $\times$  group) repeated measures ANOVAs were used to determine sex differences across time. **RESULTS:** Regardless of sex, PP (-16%;  $RER_{SOL}$  remained unchanged for both sexes (-6%;  $p>0.05$ ), while  $RER_{MG}$  was only reduced in males (-21%;  $p=0.001$ ). **CONCLUSION:** Our data indicate that explosive contractile characteristics are diminished similarly in males and females during a dynamic fatiguing task, but it appears the muscle-specific physiological mechanisms may differ between sexes.*

## **The Relationship Between Adiponectin and Dietary Iron in Non-Diabetic Young Women**

Poster Presentation - [Join now.](#)

3:45pm-4:00pm

Undergraduate Student(s): Calah Coleman, Ayaa Woday

Research Mentor(s): Katherine Ingram, Brian Kliszczewicz

**Introduction:** Adiponectin is a protein-based hormone that is secreted by adipocytes and assists in several metabolic processes including glucose regulation and fatty acid oxidation. Low adiponectin levels have been linked to metabolic conditions such as increased insulin resistance and obesity. Previous studies have shown that circulating iron has an inverse relationship with adiponectin levels. It is unknown whether dietary iron has the same association with adiponectin levels. **Purpose:** The purpose of this study is to examine the relationship between dietary iron intake and adiponectin levels. **Methods:** This study examined 42 non-diabetic women (Age:  $20.7 \pm 2.8$  years; BMI  $27.6 \pm 3.6$ ). The subjects' dietary nutrient intake was assessed using a self-reported method through the Automated Self-Administered 24-hour (ASA 24) questionnaire. Subjects visited the KSU Human Performance



Laboratory after an overnight fast. Body composition was measured using dual energy x-ray absorptiometry (DXA). Blood samples were collected, separated, and plasma was frozen and stored until analysis. Plasma adiponectin levels were analyzed using a commercially available enzyme-linked immunosorbent assay (ELISA) kit. A partial correlation analysis was controlled for age and race. A pearson's correlation analysis was used to assess the association between adiponectin and dietary iron intake. **Results:** In this study population, adiponectin was not significantly associated with dietary iron ( $r = 0.061$ ,  $p > 0.05$ ). **Conclusions:** Though it has been previously shown that adiponectin is negatively associated with circulating iron levels, our data indicates that adiponectin is not related to dietary iron intake.

## **EFFECTS OF DYNAMIC FATIGUE ON RATE OF VELOCITY AND TORQUE DEVELOPMENT IN MALES AND FEMALES**

Poster Presentation - [Join now.](#)

4:15pm-4:30pm

Graduate Student(s): Benjamin Dalton, Phuong Ha, Michaela Alesi

Undergraduate Student(s): Tyler Smith, Anna Conroy

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

Time-dependent measures such as rate of velocity (RVD;  $\Delta\text{velocity}/\Delta\text{time}$ ) and torque (RTD;  $\Delta\text{torque}/\Delta\text{time}$ ) development are important contributors to peak power during a dynamic muscle contraction. However, sex differences in the fatigability of these parameters remain relatively unexplored. Purpose: To determine sex differences for RVD and RTD of the plantar flexors (PFs) during a dynamic fatiguing task. Methods: Recreationally active males ( $n=14$ ;  $22.4 \pm 2.2$  yrs) and females ( $n=15$ ;  $20.9 \pm 2.5$  yrs) performed a fatiguing task of the PFs consisting of 60 maximal concentric isotonic contractions at 30% of their maximal isometric strength using a dynamometer. RVD and RTD were obtained from the first five contractions of the fatigue task and five maximal isotonic contractions performed after the fatigue task. Strong verbal encouragement was provided, and participants were instructed to perform the muscle contractions "as hard and fast as possible". RVD and RTD were calculated as the linear slope of the velocity- and torque-time curve, respectively. Two-way (time  $\times$  sex) repeated measures ANOVAs were used to determine sex differences across time. Results: Regardless of sex, RVD was decreased (-14%;  $p < 0.001$ ), however, RTD was reduced in males (-18%;  $p = 0.001$ ) but not females (-8%;  $p = 0.162$ ) following the fatigue protocol. Conclusions: These data indicate that fatigue-induced decrements in quick velocity and torque production during dynamic exercise are different between sexes. Females appear to preserve the ability to produce torque quickly better than males in a fatigued state.

## **Health Promotion and Physical Education**

### **ARPets**

Oral Presentation - [Join now.](#)

11:45am – 12:00pm

Undergraduate Student(s): Cooper Freeman  
Research Mentor(s): Rongkai Guo

*This paper presents a mobile app using Augmented Reality (AR) technology to allow the players to adopt a virtual pet. The purpose was to have the player virtually buy food and drinks for their pet, using points earned by playing minigames or perform other activities to keep the pet healthy. There are certain rewards and penalties in the app to certain statistics such as hunger, thirst, energy, and happiness based on the food or drink that was selected. This was meant to encourage the user of the app to consider the benefits and drawbacks of what they eat and drink. The intent was to observe if the users could understand how to keep the pet healthy and happy in the app.*

### ***A Close Examination of Self-Care Among College Students***

Oral Presentation - [Join now.](#)

9:45am – 10:00am

Undergraduate Student(s): Adrianna Jackson  
Research Mentor(s): Mari-Amanda Dyal

*BACKGROUND: Self-care is not a groundbreaking concept but is very open to interpretation and popular in the chronic disease management literature. The current emphasis on self-care and disease management is well placed; however, it has led to gaps in self-care understanding as it relates to other populations, such as college students. College life is a state of transition that can be challenging for students. When academic and life pressures compete, college students engage in unhealthy behaviors to cope, which takes a toll on their mental and physical health. A self-care focus on college students is required to understand and identify their self-care perceptions, behaviors, protective factors, and risk factors, especially given the rich diversity of today's student population. METHODS: An extensive literature review will occur to identify what contributions there are in the self-care field as it relates to college students. Additionally, subject matter expert interviews and college student focus groups will be conducted to assess the current state of self-care within a Georgia-based college environment. These formative research activities will inform an evidence-based pilot workshop for students featuring self-care strengthening education and application. RESULTS: It is anticipated that literature review results will reveal significant research gaps as it relates to the college student population. Interviews and focus groups will yield rich qualitative data required to build a workshop that is relevant and useful to the intended population. Lastly, the workshop will 1) strengthen student self-care perceptions and behaviors and 2) provide practitioners with a self-care model to implement in this setting. CONCLUSIONS: Self-care among the college student population requires a deeper discussion than what is currently available. Self-care is not ground-breaking, but for this population that is faced with mounting risk factors, it could make all the difference in health and academic outcomes.*

### ***The Influence of Mechanical Properties Associated with Exercise Equipment Padding on Maximizing Performance and Minimizing Potential Soft-Tissue Injury when Performing High-Intensity Weight Lifting Exercises***

Poster Presentation - [Join now.](#)

1:30pm-1:45pm

Undergraduate Student(s): Robert Hewston

Research Mentor(s): Michael Hales, Mohammad Jonaidi, John Johnson

*The intention of this study is the measurement of mechanical properties such as resilience and compressibility associated with exercise equipment padding in order to determine the ability to minimize potential soft-tissue injuries while performing high-intensity weight lifting exercises. ASTM standards were used to test the resilience and compressibility of five different exercise equipment padding specimens. The specimens consisted of standard bench press foam, composite foam, polyethylene foam, a single yoga mat foam, and double yoga mat foam. The resilience and compressibility are tested to determine the amount of deformation each sample can experience and the level of energy returned back to the user while performing high-intensity weight lifting exercises. To obtain the data for the resilience test a testing-rig was first designed and assembled for the specific needs of testing exercise equipment padding according to ASTM Standard D3574-17. Three tests were performed on each sample, noting the percentage of rebound, and the mean value for each specific specimen was calculated as the final value. A second round of testing occurred on the same specimens using a one-and-a-half-inch piece of plywood under the specimen. The testing revealed the standard bench press foam to have the highest resilience at 37.8%, and the polyethylene foam to have the lowest resilience at 8%. The second round of testing also showed the standard bench press foam to have the highest resilience at 33.2% and the polyethylene foam to have the lowest at 5.2%.*

## **Nursing**

### ***KSU SNA Period Party Project: Advocating for Women's Health in the Homeless Population of Kennesaw State University***

Poster Presentation - [Join now.](#)

2:00pm-2:15pm

Undergraduate Student(s): Alice Barry

Research Mentor(s): Linda Sutton, Doreen Wagner

*In one of the wealthiest countries in the world, women are being deprived of the basic human right of access to proper feminine hygiene products and education. The purpose of this service leadership project was to review current literature to describe menstrual hygiene as a basic human right, to explore the cost/access to feminine hygiene products in multiple studies, to examine political and international initiatives surrounding access to feminine hygiene products, and to synthesize how nursing students can advocate for primary care and health promotion in the community in which they live. The project aimed to address the overwhelming need for access to feminine hygiene products for homeless college women on the KSU campus ("About Care," 2019). This paper describes the creation and implementation of the Kennesaw State University (KSU) Student Nurses Association (SNA) Period Party Project. The project was promoted by the KSU WellStar School of Nursing SNA members to*

*provide donations of menstrual pads, tampons, and panty liners that were assembled into individual period packages. All SNA members were invited to the 1-hour event where individual period packages were assembled by 37 members. The KSU SNA addressed the stigma surrounding menstrual health through the Period Party Project and hand-delivered 200 individual period packages to the KSU CARE Services pantry to aid homeless women on the KSU campus.*