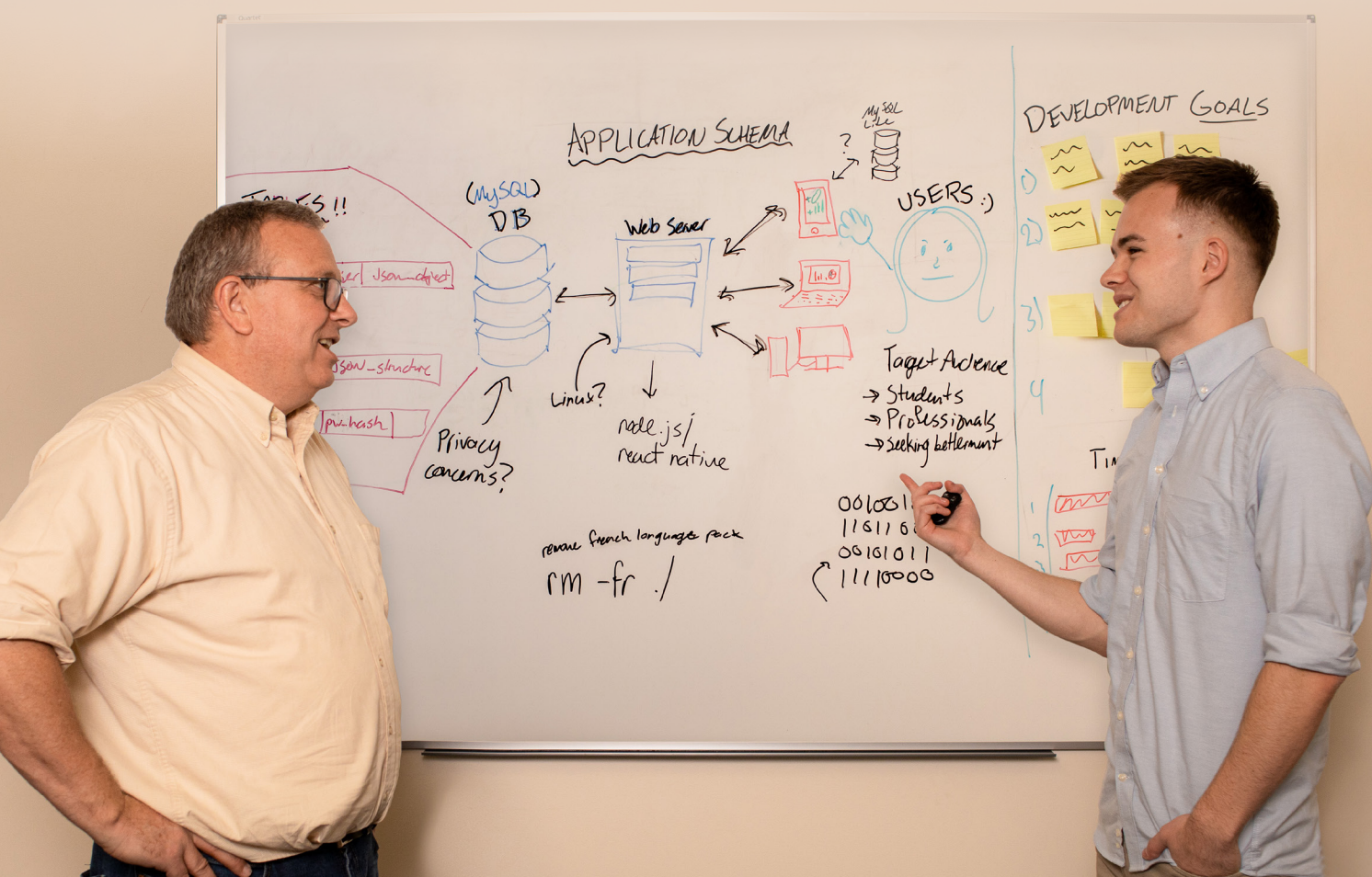


Honors Scholars and Undergraduate Research Poster Symposium

March 10, 2023 | 2:30–3:30 p.m. | Buller Hall



WELCOME

Thank you for joining us for the 2023 Honors Thesis Poster Symposium. We feel grateful and blessed to be able to gather in person to celebrate the creativity and curiosity of this year's Honors Thesis researchers. Since its founding in the 1960s, the J. N. Andrews Honors Program at Andrews University has fostered enthusiastically the transformative experiences of undergraduate research. By means of the Honors Thesis, the Honors Program requires its students to engage in substantive primary investigations in which students take an active role in posing research questions, designing and refining methodologies, collecting data and results, and critically analyzing the significance of their conclusions.

The Office of Research and Creative Scholarship serves a vital role across campus in supporting and funding quality undergraduate research. The Undergraduate Research Scholar Award was established in 2002 to facilitate more opportunities for students to engage in research and creative scholarship in greater depth than required by their individual programs of study. The URS Award enables students to work closely with faculty mentors, participate in disciplinary conferences, and develop important professional skills. Many Honors Scholars have benefited from the URS funding and have noted that support on their poster boards.

A team of highly engaged faculty research mentors makes possible a rigorous program of undergraduate research. We thank each mentor for the commitment of time and energy invested in Andrews University's young scholars. The J. N. Andrews Honors Program and Office of Research and Creative Scholarship thank the Andrews University faculty members and Honors Council members who give willingly of their time and energy to support and evaluate undergraduate research. The Honors Council Members include: Sonia Badenas, Karl Bailey, Anthony Bosman, Kylene Cave, Vanessa Corredera, Ryan Hayes, Katherine Koudele, Beatriz Martins, Benjamin Navia, Alexander Navarro, L. Monique Pittman, Davide Sciarabba, Karin Thompson, Rhonda Tomenko and Robert Zdor. We also thank our Honors Program administrative assistant and recruiter, Maxine Umaña, and the ORCS staff, Carlisle Sutton and Mordekai Ongo, as well as our student assistant, Isabella Koh, for their hard work in helping to make this event a success.

Many thanks for working together!



L. Monique Pittman, PhD
Director of the J.N. Andrews Honors Program
Professor of English



Gary Burdick, PhD
Dean of Research
Professor of Physics

HONORS THESIS POSTER PRESENTATIONS

- P-01 Valerie Akinyi (Stephanie Carpenter & Gary Wood, History & Political Science)
The Bounty On Santa: The Arctic and International Order
J.N. Andrews Honors Scholar

While much has been written about the ecological impact of climate change in the Arctic, little has been written about how the High North will impact international order by eroding long-held philosophical ideas. By utilizing the political philosophy of Hugo Grotius as the basis of analysis for contemporary domestic and international maritime policy, my research uncovers what action (or inaction) in the Arctic will mean for international order and asserts that a return to the Grotian idea of the free seas would prevent catastrophic conflict.

- P-02 Elizabeth Borton (Stefanie Elkins-Bates, Visual Art, Communication and Design)
Window to Heaven: Exploring Iconography as an Expression of Faith
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Window to Heaven explores Orthodox Christianity whilst simultaneously breaking away from Seventh-day Adventism. Finding significance in Orthodox tradition, ritual, and intentionality are integral. Using Orthodox iconography, this project seeks to portray this separation from Adventism and reconnection with traditional Christianity. This series of seven icons explores personal experiences with Christianity and presents iconography to an Adventist audience as a tool for a deeper relationship with God and to other artists as a medium to express theological, social, or political beliefs. Ultimately, this project uses the established tradition of Orthodox iconography as a means of exploring my Christian identity.

- P-03 Abraham Bravo (Gary Wood, History & Political Science) *Tyranny of the Minority: Tech Corporations*
J.N. Andrews Honors Scholar

Political commentators have warned that American democracy is threatened by tyranny. My thesis seeks to understand what this danger entails. By using the ideas of philosopher Leo Strauss, I studied premodern tyranny using classical political science to better understand modern tyranny's nature. The difference between modern and classical tyranny is the introduction of new tools: ideology and technology. My research focused on technology, specifically data collection from major social media companies like Facebook, Google, and Twitter, to understand how they manipulate human behavior/thought. I will show the threat posed by these companies as a new example of an old problem.

- P-04 Alaina Burghardt (Pedro Navia, International Languages & Global Studies)
Documentary Film: "Berrien Springs: A New Stranger in Town"

J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Due to the presence of businesses owned and operated by persons of varying ethnicities and churches with congregations of groups such as Korean, Latinx, Haitian, and Filipino people, we wonder how ethnically diverse Berrien Springs is, and how and when that diversity began. The question presented is how ethnically diverse is the town of Berrien Springs. We will attempt to answer this question by interviewing members of select ethnic groups as well as prominent figures in the town's leadership and also researching at the local newspaper, heritage center, and village office to gather information on the community of Berrien Springs and how those who have moved there find it.

- P-05 Lauren Butler (Benjamin Navia, Biology)
*Seasonal Variation in Phonotaxis of Female Cricket *Acheta domesticus**
J.N. Andrews Honors Scholar

Previous studies have shown that temperature, exposure to male cricket pheromones, and Juvenile Hormone III are factors that change behavior in female *Acheta domesticus*, yet none of these investigations have indicated whether these changes are season-dependent. This research aims to detect differences in the ability of crickets to distinguish attractive calls from unattractive calls depending on the season in which they were tested using available data from the Andrews University Invertebrate Neurobiology lab. Preliminary results show no significant differences between observed and expected behavior in both young and old crickets according to season. Implications will be discussed in the presentation.

P-06 Samuel Condori (Kimberly Pichot, Management, Marketing, & International Business)
Exploring Student Engagement in Business Education at Andrews University: A Study of Cognitive, Behavioral, and Affective Engagement
 J.N. Andrews Honors Scholar

This study will examine the engagement levels of undergraduate and graduate business students at Andrews University by measuring cognitive, behavioral, and affective engagement through a survey using a Likert scale questionnaire. The study will also analyze the impact of engagement-generating activities on student engagement. The findings of this research will provide a deeper understanding of student engagement in business education, identify areas for improvement, and inform strategies for promoting engagement in the classroom. The results of this study will have important implications for enhancing student learning outcomes and academic success in business education at Andrews University.

P-07 Caryn Cruz (Vanessa Corredera, English)
Who Can Be a Victim?: I May Destroy You As Intersectional Resistance to Rape Culture
 J.N. Andrews Honors Scholar

Film, T.V., literature, and other forms of entertainment have perpetually illustrated narratives that center white stories (specifically the perspective of young, conventionally attractive cis-gender, heterosexual white women), thereby ensuring the representational erasure of queer people, disabled persons, people of color, and other marginalized identities from rape culture awareness discourse. Intersectional approaches when depicting survivors are important to consider when addressing rape and sexual assault on screen. Therefore, my research will provide a close reading analysis of the HBO series *I May Destroy You*, identifying both the visual and literary elements which demonstrates the accurate, nuanced, and intersectional portrayal of survivorhood on screen.

P-08 Irina Gagliu (Kristen Witzel & Harvey Burnett, Behavioral Sciences)
Racial Disparities in the Berrien County Criminal Legal System
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

This study explores a Michigan county's felony jail data for racial disparities influenced by agents' implicit biases and systemic racism. Previous research suggests that the over-criminalization of racial minorities in the United States may be due to agents' unconscious prejudices toward members of various demographic groups. For this study, we collected a random probability sample of 349 felony case summaries from 2017-2019 from the county's sheriff's department. Using a non-experimental, descriptive, and correlational research design, we will examine whether alleged offenders' race, complexion, sex, or the intersectionality of race and sex predict increased severity in outcomes across the jail data.

P-09 Alexander Hess (Vanessa Corredera, English)
"If we're gonna heal, let it be glorious": Racism, Patriarchy, and Heteronormativity in Beyoncé's Lemonade
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Through an analysis of Beyoncé's 2016 audio-visual album *Lemonade*, I examine how racism, patriarchy, and heteronormativity co-constitute one another and threaten Black love. Employing Black Feminist and queer theory, I dissect three songs and their accompanying music videos to interrogate Beyoncé's critique of a hegemonic masculinity/femininity grounded in toxic patriarchal norms. Instead, I contend, she champions an ameliorative gender/sexual politics rooted in love and community. My thesis thereby considers how *Lemonade* imagines alternative forms of being and loving oriented in opposition to what bell hooks describes as the "imperialist white supremacist capitalist patriarchy."

P-10 Anthony Isensee (Bill Wolfer, Computing, Karl Bailey, Behavioral Sciences)
Developing Data-Driven Software to Aid Individuals in Identifying, Creating, and Achieving Meaningful Goals
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Utilizing agile software development and computational technologies, this project creates a beta version of an application designed to assist individuals in the setting of effective goals. The application takes an interdisciplinary approach to goal setting methodologies, incorporating strategies proven effective by the behavioral sciences. Two such methods include mental contrasting, a careful examination of a goal and the implications resulting from its success, and implementation intentions, the creation of a plan for overcoming a goal's largest obstacle. This software implements these strategies to develop a framework for effective goal achievement that is capable of iterative adaptation and improvement.

- P-11 Anthony Kang (Thomas Goodwin, Biology)
Experimental Replication of Squirrel Tooth Enamel Corrosion by Coyote and Raptor Digestive Systems
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

This study tested the corrosive effects of gastric acid on ground squirrel teeth exposed to the stomachs of red-tailed hawks (pH=3) and coyotes (pH=2). Results showed little mass loss and surface change after 1 hour in pH=3, while pH=2 caused 3% mass loss and changes in surface texture, including chalky texture and apical corrosion of cusps. These effects became more extreme over time, leading to exposure of dentine layers after 3 hours at pH=3.

- P-12 Rael Kim (Desmond Murray, Chemistry & Biochemistry, Denise Smith, Biology) *Synthesis of Novel Temozolomide Amide Hybrids as Potential Low-Resistant Anti-glioblastoma Agents*
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Temozolomide (TMZ) is a conventional chemotherapy used to treat Glioblastoma multiforme (GBM), one of the most lethal forms of brain cancer, but most GBM tumors eventually develop resistance to TMZ. Despite various attempts to develop a better chemotherapeutic agent, there have been no concrete examples of synthesis and investigation of anticancer activities of TMZ hybrids up to this date. The primary objective of this research is to synthesize novel TMZ amides containing different halogenated aromatics, then to evaluate the anti-glioblastoma activity of the synthesized compounds as potential new drugs for treating GBM.

- P-13 Isabella Koh (L. Monique Pittman, English)
Redefining Representation: Interrogating Race in The Hollow Crown: The Wars of the Roses (2016)
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Dominic Cooke's televisual adaptation of Shakespeare's early history plays, *The Hollow Crown: The Wars of the Roses* (2016), navigates the intersecting and often competing demands of diversity, authentic representation, and Shakespeare's universality. Although the television series strives to correct traditionally racist performance strategies through its casting of minority actors, it falters in that aim. Its over-reliance on titular white actors and the casting of multiethnic Sophie Okonedo as its major minority voice actively reinforce harmful racial and gender stereotypes. By addressing these concerns, this project intentionally develops ameliorative techniques of non-traditional casting and ethical representation.

- P-14 Daryna Kulinich (Katherine Koudele, Agriculture & Animal Science)
The Effects of Age on the Contrafreeloading Activity of Female Goats at the Agriculture Educational Center
 J.N. Andrews Honors Scholar

The study investigates the effect of age on the contrafreeloading (CFL) behavior of female guernsey goats, hypothesizing that the younger goats will engage in more CFL. Contrafreeloading is the tendency of animals to work for food despite an identical resource available for free or fed ad libitum. Three groups of goats underwent three trials in three weeks. During trials of five minutes, each goat was walked into a pen and given two choices of alfalfa hay. The first choice was freely available, while the second was placed into a suspended bin with holes for more challenging access. The interaction between the hay eaten each week and age groups was statistically significant; thus, there is a difference in the pattern across weeks by groups.

- P-15 Gloria Oh (Daniel Gonzalez-Socoloske, Biology)
The power of citizen science: Overcoming the knowledge gap of the marine mammal diversity in the Bay Islands of Honduras
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Preservation of regional biological diversity requires an understanding of the inhabiting species. However, species surveys are often difficult due to lack of resources. To close that gap and summarize the marine mammal sightings in the Bay Islands of Honduras (BIH), this study utilized citizen science, which involves the use of non-scientists to collect the data. Approximately 500 observations were collected, accounting for twelve species of marine mammals. Our study provides a much-needed baseline of the diversity of marine mammals in the BIH and reveals the power of citizen science to close knowledge gaps regarding species distributions and diversity.

- P-16 Noah Opsahl (Garth Woodruff, Agriculture)
Aesthetic Modality of Integrated Edible Residential Landscape Designs in Dayton Ohio
J.N. Andrews Honors Scholar

This thesis project will provide a site assessment, analysis, and design solution. The designs will demonstrate how an edible landscape might look in comparison to an ornamental counterpart. The site ranges from steep slopes of sunny hillside, to woods, to a low wetland space. There will be 3 sets of designs with typical design documentation. Section elevations and 3d renderings of the completed designs will be produced. A comparative plant study that contains traditional ornamental plants and edible counterparts is included. Following this, there will be a cost/benefit analysis of using edible plantings in regards to cost and production.

- P-17 Richard Powell (David Nowack, Chemistry & Biochemistry)
Determining the pH optimum for commercially prepared enzyme tyrosinase
J.N. Andrews Honors Scholar

In mushrooms, the small molecule Melanin has several functions. These include regulation of cell development, supporting microbial pathogenesis, participating in energy harvesting, and protecting against cell damage from harsh factors such as ultraviolet light, oxidizing agents, and ionizing radiation. The enzyme tyrosinase is responsible in part for the production of Melanin. We determined the pH optimum for tyrosinase under the conditions of the experiment. We determined that tyrosinase had the highest Vmax at a pH of 7.4. Spectrophotometry was used to measure the absorbance of the product and determine the enzyme activity.

- P-18 Isabella Rappette (William Peprah, Accounting, Economics, & Finance)
The Impact of Ethical Behavior on Profitability in Healthcare Practices
J.N. Andrews Honors Scholar

The goal for this research is to understand the ethical behavior implications of decisions related to the financial profitability of healthcare and to assess the level of ethical behavior in the healthcare practice. A major concern has been with the corporatization of healthcare institutions which is leading to an ethical shift from providing the high-quality of healthcare to patients to seeking profit for the shareholders. This research seeks to fill the research gap recommendation by the American College of Physicians (ACP) to provide empirical results on the significant impact of ethical behavior on profitability in healthcare practices (Crowley, et.al., 2021). This research will significantly aid healthcare providers, and administrators to appreciate the predictable impact of ethical behavior on profitability. This will help to ensure an equilibrium between high-quality healthcare and profit. This quantitative research will be based on a descriptive correlational research design.

- P-19 Kara Shepard (Margarita Mattingly, Physics)
Determining the Origins of Helix Glitches in LIGO's H1 and L1 Detectors
J.N. Andrews Honors Scholar

Due to their sensitivity, LIGO's detectors are highly susceptible to short bursts of noise known as glitches, which can disrupt gravitational wave signals. This project searches for and analyzes potential causes of the Helix glitch, which has occurred during all of LIGO's operation runs, in both detectors. The date and time of each individual occurrence were compared with the simultaneous events taking place in the detectors, to search for any correlations. In L1, it was discovered that issues with the Y-arm laser and end test mass accounted for 50% of occurrences, however these issues were not observed in H1.

- P-20 Christina Stowell (Karl Bailey and Duane McBride, Behavioral Sciences)
How I Get Things Done
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Persistence correlates with constructs in personality, social, and cognitive psychology. I studied five of these constructs (motivation, time management, locus of control, procrastination, and perfectionism) and five personality traits. I examined patterns' strength of relationships using network analysis to understand persistence's position relative to other psychological concepts. Predictions included a moderate-strong positive correlation between persistence and conscientiousness; strongly positive correlation with time management, motivation, and perfectionism; moderately positive correlation with locus of control; and weakly negative correlation with irrational procrastination. Expanding the research further supports Howard and Crayne's definition that persistence is a multidimensional explanation for why people continue tasks.

P-21 Bryan Toc Casia (Roy Villafane, Computing)
Building and Evaluating AI Models for Cello Fingerings
J.N. Andrews Honors Scholar

This thesis investigates the use of different AI models, such as neural networks and decision trees, to determine the most effective method for generating cello fingerings. This will be achieved by “teaching” the models patterns and relationships between musical notes and finger placement from existing fingerings. The results could demonstrate the potential of AI to assist cellists in finding fingerings that are efficient and technically sound, working as a starting point for cellists to make their own adjustments, thus speeding up the process. Overall, this research shows the promise of AI in augmenting the creativity and productivity of cellists.

P-22 Enlai Wang (Marlene Murray, Biology, Desmond Murray, Chemistry & Biochemistry)
The Effects of Novel Vaporyl-purine Hybrid Compound on Intracellular Inositol Levels of Lymphoblast Cells
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Bipolar disorder (BD) patients display disrupted inositol levels in their brains. Abnormally high levels of intracellular inositol occur in the manic phase of BD. Valproic acid is used to treat this phase. Although no specific drug exists for the depressive phase, antidepressants are used. Purines, which have antidepressant properties, may also be effective. This hypothesis suggests purines could increase inositol levels to treat depression in BD. A hybrid drug of valproate and purine is being explored to assess its effects on inositol levels in lymphoblast cells taken from BD patients. The formation of the hybrid compound's amide will be analyzed and its effect on intracellular inositol levels will be measured. This investigation aims to further our understanding of potential hybrid drugs for BD treatment.

P-23 Andrew Wee (Lisa Ahlberg, Chemistry & Biochemistry)
Simplification of the Extraction of Caffeine
J.N. Andrews Honors Scholar

Organic chemistry is one of the core classes needed for people interested in pre-professional programs such as Pre-Med and Pre-Dent. One of the first labs in organic chemistry involves the extraction of caffeine from a source such as coffee beans, tea bags, or maybe even caffeine tablets. Often organic chemistry students have difficulties extracting caffeine and getting a desirable result. My goal for this research is to simplify this lab procedure by determining the best caffeine source that results in the highest yield. Additionally, I want to use a green solvent to minimize the damage that could be done to the environment and the students' health.

P-24 Terika Williams (Peter Lyons, Biology)
A Study of the Reciprocal Interactions of Folates and Carboxypeptidase O
J.N. Andrews Honors Scholar

Folate is a necessary vitamin for cellular growth. Naturally, folate has many glutamate amino acids, which must be removed prior to folate absorption and function. Carboxypeptidase O (CPO) is an enzyme that may remove these glutamates. To test this hypothesis, the growth rate of MDCK cells with and without CPO and grown with folate was examined. No significant increase in growth was observed in cells with CPO. However, further experiments examining the interaction of purified CPO and folate showed the enzymatic activity of CPO to increase in the presence of glutamate-extended folate, thus supporting a relationship between CPO and folate.

UNDERGRADUATE RESEARCH POSTER PRESENTATIONS

- P-25 Aiko Ayala Rios (Marianne Kordas, Music)
 Woman Bolivian Composers in Academic music: recopilation, analysis, and solutions for a better representation.
 Undergraduate Research Scholar

Despite the progress in gender inclusivity across the field of musicology during the last forty years, there is a lack of representation of women Bolivian composers in core literature about South American music and musicians. Very few resources, except Bolivian publications, talk about these composers; even in those, there is very little presence of women composers of academic music. This project aims to raise awareness of this problem and to guide musicians to resources where relevant information can be found. We also hope to motivate more scholars to join the conversation and thus find more solutions for a better representation.

- P-26 Lily Burke (Oystein LaBianca, Social & Behavioral Sciences)
 Site Custody Activism Through Informational Booklet Content Development: A Case Study of the Hisban Cultural Heritage Project, Jordan
 Undergraduate Research Student

How can informational booklet content development support site custody activism? The Hisban Cultural Heritage Project (HCHP) aims to provide for a sustainable future for the archaeological site of Tall Hisban, Jordan. In Jordan, HCHP has pioneered site custody activism, defined by LaBianca as an archaeological team empowering their host community as partners in site maintenance. Recently, the HCHP signed a contract with the Department of Antiquities of Jordan to arrange for archeologist-supervised site maintenance work to improve the visitor experience. The next step is to provide the local community and visitors with information about the history of the site. Through a review of the literature on best practices of informational booklets of heritage sites; I will create a booklet that will educate visitors and local community stakeholders on the history of the site. Informational booklet content development can support site custody activism by educating both local community and outside visitors about the discoveries at the site and their significance for understanding the past, present, and future. The booklet will also address the logistics of facilitating visitors, supporting the local economy by listing local food and transportation services.

- P-27 Kin Long (Wesley) Chan (Padma T. Uppala, Population Health, Nutrition, & Wellness, Matias Soto, Engineering)
 Induction of Thermogenesis, a Novel Approach for Weight-loss by Natural Compounds
 Undergraduate Research Student

How can informational booklet content development support site custody activism? The Hisban Cultural Heritage Project (HCHP) aims to provide for a sustainable future for the archaeological site of Tall Hisban, Jordan. In Jordan, HCHP has pioneered site custody activism, defined by LaBianca as an archaeological team empowering their host community as partners in site maintenance. Recently, the HCHP signed a contract with the Department of Antiquities of Jordan to arrange for archeologist-supervised site maintenance work to improve the visitor experience. The next step is to provide the local community and visitors with information about the history of the site. Through a review of the literature on best practices of informational booklets of heritage sites; I will create a booklet that will educate visitors and local community stakeholders on the history of the site. Informational booklet content development can support site custody activism by educating both local community and outside visitors about the discoveries at the site and their significance for understanding the past, present, and future. The booklet will also address the logistics of facilitating visitors, supporting the local economy by listing local food and transportation services.

P-28

Sam Clough (Brendan Cross, Physics)

Conductivity of MEPA-MOCVD Grown InN and Other Group III-Nitrides

Undergraduate Research Student

Indium nitride (InN) is a member of the group III-nitride class of semiconductors which shows promise for optoelectronic applications. Despite recent increases in related research, significant questions remain regarding the methods of charge transport in thin-film polycrystalline InN. This research develops a method for understanding the conductivity through the use of impedance spectroscopy to evaluate the frequency response of InN samples grown via MEPA-MOCVD with varying growth parameters. Characterizing the impedance allows for a determination of the various capacitive effects present in thin-film InN, which provides insight into the methods of charge transport and other electrical characteristics of InN.

P-29

Devin Garcia (Yun Myung Oh, Mathematics)

Some Characterizations of Involute Curves in Euclidean and Minkowski 3-Space

Undergraduate Research Student

The involute of a space curve is a curve whose tangent vector is orthogonal to the tangent vector of another curve. In this work, we are interested in constructing a framework to further study the involute of curves in Euclidean and Minkowski three-space. Our framework relies on the curvature and ratio of torsion-to-curvature of a curve to study the involute. In classical differential geometry, a space curve is described by its curvature and torsion, and the ratio of torsion-to-curvature is an approach to classify curves. Using the ratio of torsion-to-curvature instead of the torsion is a more intuitive approach because it shows the dependence of the involute's Frenet-Serret apparatus on the nature of the original curve. We provide new insights on the involute of slant helices through our framework and provide future directions for our work.

P-30

Student Absent

P-31

Noelle L. Koliadko (Joon H. Kang, Mathematics)

Existence and Non-Existence for a General Elliptic System with Application

Undergraduate Research Student

In our work, we present sufficient and necessary conditions for the existence of positive solutions to a general elliptic system and conditions for the nonexistence of positive solutions. In the future, we want to establish their uniqueness. Our results will be applied to a generalized Lotka-Volterra model for n species, offering insight into the dynamics of species interactions in complex ecological systems.

- P-32 Samuel Namkung (Duane C. McBride & Herbert Helm, Social and Behavioral Sciences)
Gender Differences in Age of Substance Initiation at a 4-year Prohibitionist Institution
Undergraduate Research Scholar

This study aims to explore the differences in the trends of drug initiation (alcohol, tobacco, marijuana) at a prohibitionist religious university between males and females. Descriptive statistics and Cross-tabulation analysis were used to inspect patterns in the data. Our study is consistent with previous research in that women exceed men in tobacco and alcohol initiation after the age of 16. Marijuana patterns were similar. Our results indicate that women seem to initiate substances at a later age than men.

- P-33 Jongwan Park (David Nowack, Chemistry and Biochemistry)
Quantification of Heavy Metal Concentration in Local Water
Undergraduate Research Scholar

Michigan regulates 9% of the world's fresh surface water, and ongoing struggles have been made to preserve its water quality. The Flint and the recent Benton Harbor lead (Pb) contamination incidents show a need for continuous monitoring of metals in water. The goal is to build and apply a methodology for the quantification of iron (Fe), copper (Cu), and Pb at the Environmental Protection Agency's (EPA) action level in various geographical locations. The methodologies tested on collected samples showed the viability of parts per billion (ppb) detection by utilizing inductively coupled plasma-optical emission spectrometry (ICP - OES).

- P-34 Jheanna Rattray (Stacie Hatfield & Harvey Burnette)
Institutional Encouragement of LGBTQ Spirituality: Bridging the conflict between Christian institutions and LGBTQ students as it relates to sexuality and spirituality
Undergraduate Research Scholar

Evangelical Christianity has become increasingly known for its aversion to same-sex relationships. This is shown in many Christian universities, where it is commonplace to have explicit rules against same-sex romantic and sexual behavior. Despite this, many LGBTQ students attend Christian universities. This study aims to find research-backed ways for Christian universities to better support LGBTQ students. Additionally, this paper explores how to bridge the gap between Christian universities and LGBTQ students in a way that allows these students to be comfortable on campus and to explore further their complex relationship with spirituality in a way that allows them to thrive.

- P-35 Zoe Shiu (Karl Bailey, Social and Behavioral Sciences)
Perfectionism and self-compassion on burnout in music
Undergraduate Research Scholar

Musician burnout is receiving growing attention within the music community. Research among athletes points to maladaptive perfectionism as a potential predictor of burnout and self-compassion as a potential protector against it (Amemiya & Sakairi, 2020; Eklund & DeFreese, 2015). This study explores whether a similar pattern holds for musicians. I administer an online survey recruiting 100 total music majors from four private universities. I will run a relative importance analysis to determine the strongest predictors of burnout, followed by a moderation analysis of self-compassion. I hypothesize that maladaptive perfectionism will positively predict burnout, moderated by self-compassion.

P-36

Amelia Stefanescu (Sonia Badenas, International Language & Global Studies,
Stephanie Carpenter, History)
Maleficent (2014), the Glorification of Evil in Modern Portrayals of Fairy Tales.
Undergraduate Research Scholar

The story of Sleeping Beauty, adapted and changed throughout the ages, has seen many different versions, each of them reorienting the meaning of the story. It is not until recently that we have seen a version from the perspective of the story's villain in the movie Maleficent (2014), in which she justifies her traditional evil actions and refuses to fill in the role of the typical villain. I will argue for the creation of a new genre of film that seeks to justify evil and reveal the "hidden story" of a now morally-gray character instead of a cold-hearted, one-dimensional villain. By comparing and contrasting Sleeping Beauty (1959), the Disney animated film, and Maleficent (2014) through their respective interplay between good and evil, as well as how the role of Maleficent evolves from a villain to a savior, it is understandable that a giant shift has occurred in the world of fairy tales and film. This shift can very well be attributed to advancements in modern psychology, which have made people see others in gray rather than black or white, as a product of the many events of their lives rather than as a villain or a hero. This new genre of film adaptation is suitable for a public like today as it validates the needs of this generation's belief in gray characters and reflects how they see themselves

P-37

William Yoong (Hyun Kwon, Engineering)
*State of Health Prediction of Lithium-ion Batteries Using Deep Learning
Strategies and LSTM*
Undergraduate Research Scholar

Accurately predicting the state of health (SOH) of Lithium-ion batteries is crucial for management and safety. This study used data-driven machine learning methods to estimate SOH using time-series cycle data from the NASA Ames Prognostic Center of Excellence. Rather than utilizing selected features, the researchers combined principal component analysis (PCA) with deep learning methods to achieve good SOH estimation with manageable training time and low root mean square error (RMSE < 0.035). Long short term memory (LSTM) methods were also applied, which showed superior generalization performance and resilience with smaller amounts of training data compared to previous deep learning methods used.

DECEMBER 2022 HONORS THESIS POSTER PRESENTATIONS

- D-01 Hannah Cruse (Karl Bailey, Behavioral Sciences, Pedro Navia, International Languages & Global Studies)
 El laberinto del fauno: A Child's Imagination and Coping with the Trauma of War, Psychology and Spanish
 J.N. Andrews Honors Scholar

Guillermo del Toro's film *El laberinto del fauno*, known as *Pan's Labyrinth* to English speaking audiences, opens up a fantastical world that is just a touch away from reality, but everyone believes this to be the imagination of one child, Ofelia. She tries to complete tasks and learns the truth of the land of post-Civil War Spain that she currently resides in while she yearns to another. There are methods of psychotherapy for children such as rational emotive imagery, or REI, to create pathways to subdue stress and anxiety that come from difficult situations. Through the medium of imagery in psychotherapy, a child can cope with their traumatic experiences and learn solutions to the problems that they face in their reality every day, as Ofelia did in her own situation. Ofelia, in her fantasy world, ends up experiencing situations that are simultaneously happening in her reality, much like using REI. One could think that the director took a pessimistic approach by killing her in the end, after all psychotherapy is supposed to have a positive impact on a person's life, but he tells a story of fantasy being reality, solidifying the importance of an active mind and storytelling, especially during tough times. A person's imagination can teach them how to live in the real world.

- D-02 Grant Steinweg (Stephen Zork and Max Keller, Music, Karl Bailey, Behavioral Sciences)
 The Invitation: A Creative Project in Composition and Performance
 J.N. Andrews Honors Scholar and Undergraduate Research Scholar

In the fall semester of 2021, I wrote an original composition for cello and orchestra and competed with it in the annual Young Artist Competition. After having been selected as one of the soloists, I premiered my composition *Invitation* with the Andrews University Symphony Orchestra as cellist and composer in the spring semester of 2022. This project reflects upon my creative journey and assesses the effectiveness of my composition in communicating a desired felt experience to listeners. In addition to my own assessment, I also evaluate written feedback from Andrews students who attended the composition's premiere.

ABSTRACTS FOR ANDREWS UNIVERSITY UNDERGRUATE RESEARCH STUDENTS, PRESENTING AT MICHIGAN ACADEMY OF SCIENCE, ARTS, & LETTERS (MASAL) 2022

M-01

Hannah Austin, Sheila Snyder, Kimberly Pichot (Business & Administration⁺)
Consumer sentiment and behaviors in relation to the labeling and consumption of products containing genetically modified organisms

The utilization of genetically modified organisms (GMOs) in food products was approved by the FDA for human consumption in 1994 and since then has been a controversial topic in consumer sentiment. Over the past three decades, more than 90 percent of major crops in the United States such as corn, soybeans, and canola, are produced from genetically modified strains. In addition, more than 95 percent of animals used for meat and dairy in the United States eat GMO crops. The stark contrast between sentiment and production rates represents a deep void in public knowledge and food labeling practices. A combined effort of new labeling laws, redefinitions of what GMO and “bioengineering” means, and new efforts from marketers to educate the consumer have been working towards changing the attitudes of consumers towards the products they eat – products that are here to stay.

M-02

Karl G. D. Bailey, Crystal Collins, Aidan Li, Duane C. McBride (Psychology⁺)
Latitudinal variations in religiosity parallel environmental instability.

Purpose Political, economic, and ecological instability follow an equatorial-polar pattern (higher near the equator, lower near the poles). Such latitudinal variations also exist in psychology (Van de Vliert & Van Lange, 2019). We explored whether equatorial-polar gradients exist for religiosity as a means to cope with uncertainty (Kay et al., 2010; Szumowska et al., 2020; Vail et al., 2010). Procedure We examined three global samples (Pew Research Center, 2020—38,426 respondents, 34 countries; Haerpfer et al., 2022—87,821 respondents, 59 countries; strict church sample—63,756 respondents, 91 geocultural regions). We merged the data from each sample with the absolute value of population-weighted latitude to allow for linear correlations. Results We confirmed equatorial-polar gradients for environmental stability and instability (r_s -.463 to -.830). Measures of religious belief varied along the same gradient (r_s -.305 to -.770). Notably, in the strict church sample, legalism (-.725) and spiritualism (-.633)—intuitive religious beliefs thought to help make sense of disorder, but which violate of the doctrinal beliefs of this strict church—were more common in equatorial societies than high-latitude societies. Implications This study contributes to existing evidence of consistent equatorial-polar variations in cultural ecosystems and suggests coping with instability as a possible contributing factor.

M-03

Anthony Bosman, Jeanelle Green, Moises Reyes Rivas, Noe Reyes, Gabriel Palacios, (Mathematics⁺)
The impact of the delta-move on the 4-genus of links.

A knot is an embedding of a circle in 3-dimensional space; a link is a collection of knots. We can also think of a knot/link as living on the 3-dimensional boundary of a 4-dimensional ball. Then the 4-genus of a knot/link is a measure of the number of holes in a surface embedded in the 4-ball that bounds the knot/link. The delta-move is a well-studied local move on a knot/link that changes it into another knot/link. The relationship between the delta-move and the 4-genus has been studied for knots; here we extend this study to links. In particular, we show that a delta-move changes the 4-genus of a link by at most one and thus if two links are related by a sequence of delta-moves then the difference between the 4 genus of the links is bounded above by the length of the sequence. It follows that if a link is related by a sequence of delta-moves to the trivial link, then the 4-genus of the link is at most the length of the sequence.

M-04 Anthony Bosman, Yamil Kas-Danouche, Devin Garcia, Davielle Smith, Justyce Goode (Mathematics+)
Self and Mixed Delta Moves on Algebraically Split Links

A link is an embedding of circles into 3-dimensional space. A Delta-move is a local move on a link diagram. The Delta-Gordian distance between links measures the minimum number of Delta-moves needed to move between link diagrams. We place restrictions on the Delta-move by either requiring the move to only involve a single component of the link, called a self Delta-move, or multiple components of the link, called a mixed Delta-move. We prove a number of results on how (mixed/self) Delta-moves relate to classical link invariants including the Arf invariant and crossing number. This allows us to produce a graph showing links related by a self Delta-move for algebraically split links with up to 9-crossings. For these links we also determine the Delta-splitting number and mixed Delta-splitting number, that is, the minimum number of Delta-moves needed to separate the components of the link.

M-05 Lily Burke, Oystein LaBianca (Anthropology+)
Site Custody Activism Through Informational Booklet Content Development: A Case Study of the Hisban Cultural Heritage Project, Jordan.

How can informational booklet content development support site custody activism? The Hisban Cultural Heritage Project (HCHP) aims to provide for a sustainable future for the archaeological site of Tall Hisban, Jordan. In Jordan, HCHP has pioneered site custody activism, defined by LaBianca as an archaeological team empowering their host community as partners in site maintenance. Recently, the HCHP signed a contract with the Department of Antiquities of Jordan to arrange for archeologist-supervised site maintenance work to improve the visitor experience. The next step is to provide the local community and visitors with information about the history of the site. Through a review of the literature on best practices of informational booklets of heritage sites; I will create a booklet that will educate visitors and local community stakeholders on the history of the site. Informational booklet content development can support site custody activism by educating both local community and outside visitors about the discoveries at the site and their significance for understanding the past, present, and future. The booklet will also address the logistics of facilitating visitors, supporting the local economy by listing local food and transportation services.

M-06 Lauren Butler, Benjamin Navia (Zoology+)
*Seasonal variation in phonotaxis of female cricket (*Acheta domesticus*)*

Animals respond to stimuli, subsequently changing their behavior, and crickets are no different. Previous studies have shown that environmental conditions such as temperature and exposure to pheromones of male crickets are two factors that change behavior. Juvenile Hormone III is known to change behavior as well, yet none of these investigations have indicated whether these changes are season-dependent. The goal of this project is to determine whether there is a difference in the ability of crickets to distinguish attractive calls from unattractive calls depending on the season in which they are tested using available data from the Andrews University Invertebrate Neurobiology lab which includes year ranges of 2002 to 2004 and 2013 to 2018. The observed results of phonotactic behavior in each season will be compared with the expected results reported and published in the Stout et al. 2010 investigation in which younger crickets were found to be more attuned to attractive calls than older crickets. A chi square test for goodness of fit is used to compare the observed phonotactic behavior with expected phonotactic behavior in each season to determine if there are significant differences between the two. Preliminary results show that there are no significant differences between observed and expected behavior in both young and old crickets according to season.

M-07

Katherine Clayton (Anthropology⁺)
The necropoleis of Ebus and the Decapolis

Are the tomb styles found in Ebus also present in Decapolis cities? Often the Decapolis is thought of as a league of 10 cities. However, there is evidence that it was a political and cultural region of those main cities and the surrounding areas. The theory of transculturation suggests that if two cultures/societies are in close contact for a prolonged period, there should be an exchange of cultural traits, in this case, tomb styles. Excavation reports and articles from cities in the traditional Decapolis were reviewed and compared the Hesban (Ebus) tomb typology written by Waterhouse (1998). Only 6 tomb styles are included in the typology and are thus the only ones included in the study. There are however, other tomb styles in existence in the Decapolis that are not accounted for since they were not present at Ebus. This study posits that due to transculturation between Romans and the Levantine people, some of the tomb designs common in the Decapolis are also common at Ebus.

M-08

Sam Clough (Brendan Cross, Physics⁺)
Conductivity of MEPA-MOCVD Grown InN and Other Group III-Nitrides
Undergraduate Research Student

Indium nitride (InN) is a member of the group III-nitride class of semiconductors which shows promise for optoelectronic applications. Despite recent increases in related research, significant questions remain regarding the methods of charge transport in thin-film polycrystalline InN. This research develops a method for understanding the conductivity through the use of impedance spectroscopy to evaluate the frequency response of InN samples grown via MEPA-MOCVD with varying growth parameters. Characterizing the impedance allows for a determination of the various capacitive effects present in thin-film InN, which provides insight into the methods of charge transport and other electrical characteristics of InN.

M-09

Samuel Condori Alanoca, Kimberly Pichot (Business & Administration⁺)
The effects of space and activities on student engagement in the School of Business

Student engagement has become an area of increased concern in higher education as students emerge post-Covid and enter into their college experience. The School of Business at Andrews University underwent both infrastructural changes with the renovation of their lobby and increased social activities with the revitalization of a business club. Research indicates that both of these elements (infrastructure and meaningful activities) can highly affect student engagement, this study attempted to analyze the affects of both elements coming out of Covid as juniors and seniors would remember what life was like prior to these modifications. The study aimed to gain insight into students' sense of purpose in their involvement, feelings of belonging, and overall engagement, both from having a "space" to study and hang out and the additional activities provided.

M-10

Samantha Davis, Alina Baltazar, Duane McBride (Psychology⁺)
Differences in gender response to adverse childhood experiences

Purpose -- There has been considerable research on how Adverse Childhood Experiences (ACEs) affect later life. This study examines how gender relates to the possible impact of childhood ACEs. Procedure -- We focused on the relationship between ACEs and lifetime substance use in a population of college students at a faith-based university that prohibits the use of alcohol, tobacco, marijuana, or any illicit substance. We also used the Depression Anxiety Stress Scales (DASS) to examine the relationship between ACEs and anxiety and depression. Data were collected in an IRB approved 2018 Health Risk Assessment survey. Results -- For males there was a significant relationship between ACEs and lifetime substance use; but not for females. For males $r=.27$; $p=.000$ whereas for females, $r=.07$, $p=.16$. For males, the correlation between ACEs and severe or extremely severe levels of anxiety was $.04$, $p=.59$; for females, the correlation was $.18$, $p=.001$. For depression, males had a correlation between ACEs and severe or extremely severe depression of $.04$, $p=.59$ compared to females who had a correlation between ACEs and severe or extremely severe levels of depression of $.13$, $p=.02$. Conclusions & Implications -- The data suggest that there are significant gender differences in how the ACEs are expressed, with males more likely to externalize the impact and use substances.

M-11 Zachary Duah (Mathematics⁺)
The Delta Crossing Number for Links.

An m -component link is an embedding of m circles into 3-dimensional space; a 1-component link is called a knot. The diagram for a link may be drawn so that all crossings occur within delta tangles, collections of three crossings as they appear in a delta move. The delta crossing number is defined to be the minimal number of delta tangles in such a diagram. The delta crossing number has been well-studied for knots but not for links with multiple components. Using bounds, we determine the delta crossing number for several 2-component links with up to 8 crossings as well as for Tait's infinite family of 3-component links with unknotted components. Moreover, we prove that the difference between the delta crossing number and the delta unlinking number can be arbitrarily large.

M-12 Irina Gagliu, Kristen Witzel, Harvey Burnett (Psychology⁺)
Racial disparities in the Berrien County criminal legal system

This study aims to explore a southwestern Michigan county's felony jail data for racial disparities influenced by agents' implicit biases. Previous research suggests that agents' unconscious prejudices may influence the over-criminalization of racial minorities in the United States. Race and the intersectionality of race and gender are frequently observed as determinants of such findings. More recently, the impact of individuals' complexions has increasingly been considered a potential determinant. Thus, we aim to add to this growing research by examining whether alleged offenders' race, complexion, sex, or the intersectionality of race and sex predict an increased number of bookings and offenses from 2017-2019. We will conduct a non-experimental, descriptive, and correlational research design with a random probability sample of felony jail data files provided by the county's sheriff's department (target $N = 300$). This in-progress project has received IRB approval (#22-029), with 96% of our data currently collected. We anticipate that being Black, perceived as darker-skinned, or being both Black and male will be the greatest predictors of receiving more bookings and total recorded offenses. We also expect that race will be the strongest predictor of the observed variables.

M-13 Ryan T. Hayes, Seth Williams (Chemistry⁺)
PAMAM dendrimer stability analysis using size-exclusion chromatography.

The enzymatic and thermal stability of dendritic nanoparticles is not well characterized in peer-reviewed literature. In addition, dendrimers are produced in a variety of sizes, shapes, chemistries, and solubilities that influence their stability. PAMAM dendrimers were exposed to varying temperatures and times in aqueous solutions to assess the level of degradation using size exclusion chromatography (SEC). SEC works well to characterize degradation since most processes that lead to degradation result in smaller structures relative to the original larger, spherical dendrimer. We investigated G2, G3, and G4 PAMAM amine dendrimers' stability over a few days at 60°C and full breakdown to small, monomer-size fragments was observed and measured. Dendrimers, like proteins, have many uses in biochemical research and life science. This research could prove beneficial to many disciplines that use dendrimer nanoparticles including medicinal uses involving oral delivery of pharmaceuticals. Thermal characterization is an important first step of stability characterization before embarking on future research on enzymatic stability.

- M-14 Alexander Hess (Language & literature⁺)
"If we're gonna heal, let it be glorious"; racism, patriarchy, and heteronormativity in Beyonce's (Lemonade) album

Since the height of the COVID-19 pandemic in 2020, the United States and other Western countries have become acutely aware of the ways in which systemic bigotry interacts with people's lives in unignorable ways. These queries regarding the repercussions of bigotry on self-identity and interpersonal relationships are central to Beyonce's 2016 album *Lemonade*. My project explores how racism, patriarchy, and heteronormativity negatively affect Black love and relationships as revealed through an analysis of three songs and their accompanying visuals from *Lemonade*. By unpacking a song and visual from each respective section of Beyonce's three-part journey, my project demonstrates that pop culture can act as a critical means for exposing norms and oppressive systems, pushing us to confront our complicity within those institutions and offering the potential for restoration and growth. In doing so, I use Beyonce's journey through *Lemonade* as a model for how to turn from masculinity/femininity grounded in patriarchy to an ameliorative gender/sexual politic rooted in love and community. Ultimately, my analysis considers how Beyonce models and imagines alternative forms of being and loving through *Lemonade* in ways that place themselves in binary opposition to what bell hooks describes as the "imperialist white supremacist capitalist patriarchy."

- M-15 Rekha Issac, Sarah Wolf, Min Seo Kang, Jasmine Cha, Christine Choi, Elim Choi, Jessica Yi, Allana Benjamin, Brian YY Wong (Biochemistry & Molecular Biology⁺)
Aqueous extract of (Bryophyllum pinnatum) induces and modulates apoptosis in MDA-MB-157, 93A, and 93B breast cancer cells.

Bryophyllum pinnatum (BP) has been widely used in tropical regions as traditional medicine. It is reported to have antioxidant, immunomodulatory, anti-inflammatory, antihypertensive, antidiabetic, wound healing, cytotoxic, and antitumor-promoting activities. Programmed cell death (apoptosis) is critical in the control of cancer development. Our previous study showed that BP selectively induces and modulates apoptosis in HCT-116 colon cancer cells while not significantly affecting the normal CCD-841 CoN colon epithelial cells. Breast cancer cell lines MDA-MB-157, 93A, and 93B are drug-resistant APC mutants. In this study, the effectiveness of BP in apoptotic modulation of breast cancer cell lines MDA-MB-157, 93A, and 93B was investigated. Assessments were performed using the green/red/blue fluorescent Apoptosis/Necrosis Detection Test and the Human Apoptosis Antibody Array - Membrane [43 Targets] Test (Abcam). Fluorescent apoptosis data showed that a 2-hour treatment with 1.5 mg aqueous extract of BP induced a statistically significant percentage of apoptosis in these breast cancer cells as compared to the negative control. Modulation of various pro-apoptotic proteins and anti-apoptotic proteins with BP incubation was also observed. These results suggest that BP contains potential chemopreventive phytochemicals that induce apoptosis in MDA-MB-157, 93A, and 93B breast cancer cells via the regulation of various pro-apoptotic and anti-apoptotic proteins.

- M-16 Anthony Kang, H. Thomas Goodwin (Zoology⁺)
Experimental Replication of Squirrel Tooth Enamel Corrosion by Coyote and Raptor Digestive Systems.

The effects of owl predation on breakage and corrosion of bones and teeth have been reported repeatedly, especially for murid and arvicolid rodents. However, less is known about the role of predators in concentrating the bones and teeth of diurnal small mammals such as ground squirrels, even though they are common in some fossil sites. Here, we experimentally approximate the gastric pH of two predators known to predate ground squirrels, red-tailed hawks (pH = 3) and coyotes (pH = 2), and track patterns of corrosion on single teeth of ground squirrels through time of acid exposure. At pH = 3, little mass loss (~1%) was observed after 1 hour; and little change in surface texture was observed after 2 hours. In contrast, at pH = 2, ~3% mass loss was observed after 1 hour; and patches of white, chalky surface texture, as well as some corrosion of the apical regions of cusps, began to appear. The chalky surface texture and apical corrosion of cusps became more extreme after 2 hours, with the cusp apices becoming more triangular with corrosion. Further work will extend these observations in time.

- M-17 Lauren Kim, Lillyanna Widdicombe, Benjamin Navia (Zoology⁺)
Evaluating the role of protein kinase C inhibitor H7 on phonotactic selectivity in virgin female cricket (Acheta domesticus).

Crickets locate potential mates through phonotaxis, or movement towards sound. Young female crickets selectively respond to calling songs that have a frequency used by conspecific males. However, as female crickets age, they become increasingly less selective and respond to a wider range of songs. This change in selectivity has been correlated with changes in the levels of juvenile hormone III (JHIII)--higher levels of JHIII increase selectivity in the crickets. It has been reported that in mosquitos JHIII works through a protein kinase C pathway to exert its effects. We therefore hypothesize that inhibiting the protein kinase C pathway in crickets would also inhibit the effect of JHIII on the underlying network which controls phonotactic selectivity. Literature mentions that the chemical H7 inhibits protein kinase C, potentially working against the effects of JHIII by blocking the PKC pathway due to its ability to inhibit cyclic GMP-dependent protein kinases. Preliminary results show actual injection of H7 into the prothoracic ganglion makes young female crickets of the species *Acheta domesticus* unresponsive rather than unselective when compared to injections of saline in the control group. Extracellular recordings of the L3 neuron when treated with H7 have yielded comparable results.

- M-18 Chan Kin Long, Wong Wai Ho, Matias Soto, Padma P. Tadi Uppala (Biochemistry & Molecular Biology⁺)
A novel approach to weight loss using natural compounds by Browning of adipose tissue via the AMPK Pathway.

Background: Obesity is a world-wide epidemic. In 2022, four in ten Americans are obese and world-wide there are 650 million obese adults. The purpose of this pilot study is to perform a literature review to develop a novel approach to weight loss. The term browning describes the emergence of beige adipocytes in white adipose tissue, a process that represents adaptation to increased thermogenic demand and exercise. Browning helps reduce weight and improves lipid profile. Methods: Google Scholar search engine was conducted using the key words "browning", "AMPK pathway", "mitochondrial biogenesis", and "thermogenesis." Boolean operators like AND or OR were used. Studies that identified natural compounds with the ability for upregulation of mRNA involved in browning mechanisms and improve lipid profile were selected. Results: The adipogenic lineage of white, brown, beige adipose cells was identified. Browning mechanism was shown to occur via the AMPK pathway. Two compounds were identified as strong upregulators of PRDM16. Two compounds were also identified as strong predictors of improving lipid profile. Conclusion: Two natural compounds were identified as foods with high potential for browning mechanisms, Future studies will include the synthesis of a supplement using the identified compounds for weight loss.

- M-19 Isabella Koh (Language & Literature⁺)
Redefining representation: interrogating race in Dominic Cooke's (The Hollow Crown)

This project examines the themes of universality, diversity casting, and authenticity within Shakespearean history plays, specifically tracking how these core subjects manifest in Dominic Cooke's *The Hollow Crown: The Wars of the Roses* (2016). The series, in many ways, strives to push back against negative hegemonic traditions through its casting of minority actors. However, its reliance on titular white actors to market and support the show, in addition to the casting of Sophie Okonedo as the major minority voice within the production, reveal problematic undertones and commentary on minority voices as a whole. By exploring the benefits and drawbacks of non-traditional casting in history plays, I analyze how implicit stereotypes and outward perceptions of a minority figure can influence a given role. Because casting choices both reflect and influence the way that a global audience engages with a piece of work, these concerns must be addressed in order to identify the potential avenues of harm and benefit that come from casting a minority actor in a historically white role. Ultimately, I consider how theater and production companies have balanced a promise of diversity with a commitment to accuracy, seeking out an ethical or successful approach to non-traditional casting in Shakespearean history plays.

M-20 Noah Koliadko, Christopher Inae, Jay R Johnson, Simon Wing (APL/JHU), Toshi Nishimura (Boston University), Sebastian Mrak (University of Colorado)
(Physics⁺)

Analyzing the ionospheric drivers of scintillations

This research examines the correlation between global TEC and Chain radar scintillation data in order to better understand the cause of atmospheric signal scintillation. This is important for improving satellite communication quality. Data coordinates were converted to AACGM coordinates and magnetic local time, and then binned into half a degree by one-hour bins. Time shifted linear correlation and mutual information tests were performed on a year of data spanning a range of magnetic latitude and magnetic local time. Preliminary results suggest that there is correlation between TEC and S4 amplitude scintillation and ?TEC and phase scintillations. There are dawn-dusk asymmetries that depend on latitude, with a stronger response at dawn at mid-latitudes but extending to lower latitudes at dusk. The response of phase scintillations at mid latitude is strongest at a time lag of 10-20 minutes, while the response at low latitude is faster. The dawn asymmetry is consistent with diffuse electron precipitation at mid-latitudes and the asymmetry in the low-latitude boundary of the mutual information is consistent with the low latitude precipitation boundary.

M-21 Noelle Koliadko, Joon Hyuk Kang (Mathematics⁺)

Existence and nonexistence for a general elliptic system with application.

In our research, we establish a sufficient condition for the existence of positive solutions to the general elliptic system. In the future, we plan to investigate the conditions under which positive solutions to the system do not exist. We wish to apply the solutions to a generalized Lotka-Volterra model for n cooperating species. This can provide insights into the dynamics of species interactions in complex ecological systems, and may aid in predicting the behavior of biological populations.

M-22 Daryna Kulinich, Katherine Koudele (Zoology⁺)

The effects of age on the contrafreeloading activity of female goats

Contrafreeloading is the tendency of animals to work for food despite an identical resource available for free with no extra effort required. This study investigates the effect of age on the contrafreeloading (CFL) behavior of female Guernsey goats, hypothesizing that the younger goats will engage in more CFL than older goats. Guernsey goats at Andrews University Agriculture Education Center were split into three age groups: 1) mature does (age 6-7 years, n=3), 2) young does (age 2 years, n=4), and doe kids (3-5 months old, n=6). Each goat underwent three trials in three weeks (one trial/week). During the five-minute trials, each goat walked individually into the test pen and found two choices of alfalfa hay. The first choice was freely available while the second was in a suspended bin with holes for more challenging access and permit the animals to engage in CFL. The amount of hay eaten each week was measured and was statistically significant among the age groups. The hypothesis was supported that the doe kid group would express an increased interest in CFL behavior. This was a pilot study and future research can benefit from a larger sample size.

- M-23 Justin Liebelt, Benjamin Navia (Zoology⁺)
The effects of chelerythrine chloride on the syllable period selectivity of female crickets, (Acheta domesticus).

The syllable period is the most important parameter of the calling song of male crickets. Females respond phonotactically to calls with the most attractive syllable period (syllable period selectivity). This syllable period selectivity of phonotaxis in females *Acheta domesticus* is influenced by juvenile hormone III. Female crickets exhibit peak levels of juvenile hormone III at four days old. These increased levels have been correlated with increased syllable period selectivity. One of the juvenile hormone III pathways is mediated by protein kinase C. A protein kinase C inhibitor, chelerythrine chloride, was injected into the prothoracic ganglion to further explore the effects of the juvenile hormone III pathway. These injections attempted to block the effects of juvenile hormone III on syllable period selectivity. Preliminary data suggest that injections of chelerythrine chloride lead to a decrease in the responsiveness of females to syllable periods. Implications of our findings will be addressed.

- M-24 Samuel Namkung, Duane C. McBride & Herbert W. Helm (Psychology⁺) *Gender Differences in Age of Substance Initiation at a 4-year Prohibitionist Institution.*

Problem: This study aims to explore the differences in the trends of drug initiation (alcohol, tobacco, marijuana) at a prohibitionist religious university between males and females. Rates of substance use for both annual and lifetime use have been studied (McBride, 2021). However, there is a lack of recent research that looks at gender differences on substance initiation. Previous literature shows that the percent of women initiating tobacco exceeds men in nearly every year after 16 years old (Thompson, Tebes, & McKee, 2015), and that female initiation of alcohol exceeded men nearly every year after the age of 17 (York et al., 2004). Methods: Data on substance initiation at a prohibitionist religious university was collected over the course of four years (2000, n=800; 2005, n=764; 2012, n=760; 2018, n=664). A purposive sample was collected. In total, 20-25% of the student body were sampled. Descriptive statistics and Cross-tabulation analysis were used to inspect patterns in the data. Results: Our study is consistent with previous research in that women exceed men in tobacco and alcohol initiation after the age of 16. Marijuana patterns were similar. Implications: Our results indicate that women seem to initiate substances at a later age than men.

- M-25 Wesley Martin, Jay Johnson, Simon Wing (Johns Hopkins University Applied Physics Laboratory) Xuanye Ma (Embry-Riddle Aeronautical University), Peter Delamere (University of Alaska Fairbanks) (Physics⁺)
Identifying Kelvin-Helmholtz turbulence structures and cross-scale coupling in MHD and hybrid simulations with transfer entropy.

Kelvin-Helmholtz vortices frequently develop at the magnetopause boundary of planetary magnetospheres where there is a gradient in the flow. The nonlinear development of vortices involves coalescence, where smaller vortices combine into larger vortices in an inverse cascade. Simulations also show that in the later stages, the vortex structures are unstable due to the Rayleigh-Taylor instability caused by density gradients, and the coalescing structures can fragment into small scales in a forward cascade. Our study uses transfer entropy to explore cross-scale coupling in MHD and hybrid simulations of Kelvin-Helmholtz instability. Viewing the polar spectral densities of the simulations identifies the timescale and directionality of cascade dynamics. A windowed transfer entropy analysis of the spectral densities shows how the dynamics of the cascades evolve in each simulation. This study provides evidence that nonlinear coupling across scales is important in the turbulent process and demonstrates transfer entropy's usefulness in analyzing such processes.

M-26

Gloria Oh, Eric Angel Ramos (FINS), Nataly D. Castelblanco-Martínez (FINS), Daniel Gonzalez-Socoloske (Zoology⁺)
The power of citizen science: Overcoming the knowledge gap of the marine mammal diversity in the Bay Islands of Honduras.

Preservation of biological diversity requires an understanding of the species inhabiting the region. However, species surveys can be difficult due to the lack of accessibility, finances, and resources. Citizen science refers to the utilization of non-scientists in data collection. This type of data collection, combined with online platforms (e.g., iNaturalist) and smartphones with cameras and GPS, has become a potential solution to those knowledge gaps, such as the marine mammal information scarcity in Honduras. Citizen science can be especially effective in tourist destinations like the Bay Islands of Honduras (BIH). This study summarizes the marine mammal sightings in the BIH in the last twenty years from sources including published papers and citizen science data. The citizen science data were collected from three groups: locals and tourists of the BIH, social media posts, and citizen science online platforms. Approximately 120 sightings were collected, accounting for ten species of marine mammals. The most common species were rough-toothed dolphins (*Steno bredanensis*) and bottlenose dolphins (*Tursiops truncatus*). Our study provides a much-needed baseline of the diversity of marine mammals in the BIH and reveals the power of citizen science to close knowledge gaps regarding species distributions and diversity.

M-27

Jack Proctor, Sheila Snyder, Kimberly Pichot (Business & Administration⁺)
The secret influence of behavioral scripts on your everyday purchases.

We all have behavioral scripts for every series of actions we take. These subconscious scripts tell us the sequence of expected behaviors we anticipate for anything we do—every step we take from entering a store to exiting, for example. Research indicates that behavioral scripts are individually held and play an active role in our experiences and recollection of said experiences (Bower et al, 1979). Despite there being a plethora of research on behavioral scripts in psychology, there is little research of behavioral scripts within the field of marketing and consumer behavior. We know that behavioral scripts affect human behavior, but the effects on consumer behavior are less known. This research explores the ways in which scripts affect buyer behavior, how marketers' knowledge of scripts can elevate their influence, and whether going with or against a consumer's script is most beneficial to the business.

M-28

Jheanna Rattray, Stacie Hatfield, (Anthropology⁺)
Institutional encouragement of LGBTQ spirituality: Bridging the conflict between Christian institutions and LGBTQ students as it relates to sexuality and spirituality.

Evangelical Christianity has become increasingly known for its aversion to same-sex relationships. This is shown in many Christian universities, where it is commonplace to have explicit rules against same-sex romantic and sexual behavior. Despite this, many LGBTQ students attend Christian universities. This study aims to find research-backed ways for Christian universities to better support LGBTQ students. Policies against same-sex intimacy prevent students from exploring their identities freely and potentially create an unwelcoming environment for all LGBTQ students on campus. A conflict between students and the institution creates a difficult campus life. This study surveyed academic articles regarding LGBTQ spirituality, which were qualitatively coded into themes of Christian institutions and sexuality. The examined articles express the negative effect these Christian universities have on their LGBTQ students through policy and school climate, as well as possible solutions. Additionally, this paper explores how to bridge the gap between Christian universities and LGBTQ students in a way that allows these students to be comfortable on campus and to explore further their complex relationship with spirituality in a way that allows them to thrive.

M-29

Moises Reyes Rivas, Daniel Block (Duke University) (Mathematics⁺)
The existence and uniqueness of a Nash equilibrium in mean field game theory.

In recent and past works, convexity is usually assumed on each individual part of the action functional in order to demonstrate the existence and uniqueness of a Nash equilibrium on some interval $[0, T]$ (this meant that each hessian was assumed to be nonnegative). Particularly, a certain assumption was imposed in order to quantify the smallness of T . The contribution of this project is to expand on this with the key insight being that one does not need the convexity of each part of the action, but rather just an appropriate combination of them, which will essentially “compensate” for the other two terms to yield convexity in the action. This is meaningful in both the pure and applied settings as it generalizes the existence and uniqueness of a Nash equilibrium slightly more, but maybe more importantly matches realworld application slightly closer, as in reality there are many settings in which not each part of the action have convexity. Thus, it is more accurate for modern application of Mean Field Game Theory.

M-30

Devaney Ross (Psychology⁺)
Exploring the Effect of Resilience Training on the Effectiveness of Psychological Body Armor among College Students.

Exploring the Effect of Resilience Training on the Effectiveness of Psychological Body Armor among College Students. Problem: This study seeks to explore how training in Psychological Body Armor (PBA), can improve the level of resilience capacity among college students. Procedure: This study will be utilizing both a survey design and a matched-pair group design. One hundred and forty-nine (149) subjects were recruited from a university Wellness class. After giving informed consent, students will complete the 20-item PBA questionnaire (Tan et al., 2022) during the first two weeks of the 2022 fall semester to establish a resilience capacity baseline and the last two weeks with a one-hour resilience training developed from the Burnett and colleagues’ studies during the 7th week the semester. The study has received University IRB approval (#17-143). Expected Results: Through conducting a paired sample T-test on the pre- and post-questionnaire data, I expect that subjects will exhibit higher resilience capacity post-test scores on the PBA questionnaire compared to their baseline pre-test scores after receiving resilience training. Implications: An implication of this study would be that student who complete resilience training through the Wellness course can improve their resilience capacity (PBA), thereby increasing their ability better face adverse situations.

M-31

Erica Shin, Masy Domicillo, Donn LaTour, Peter J. Lyons (Biochemistry & Molecular Biology⁺)
Exploring protein folding mechanisms in metallocarboxypeptidase enzymes

Proteins often require chaperones for correct folding. Carboxypeptidase A1 (CPA1) is an enzyme that contains a prodomain that has been previously inferred to be an intra-molecular chaperone. A related enzyme, carboxypeptidase O (CPO), lacks a prodomain and therefore questions the necessity of the prodomain for folding. To explore this further, the amino acid sequence of CPO was analyzed to find conserved residues unique to CPO when compared with CPA1 and related carboxypeptidases. Four such residues were found, through site-directed mutagenesis and western blotting, to be necessary for CPO expression. To examine if these four residues could also allow CPA1 to fold without a prodomain, an HA-tagged version of CPA1 was made and the prodomain deleted using PCR. The four specific residues necessary for folding of CPO were transferred to CPA1 by site-directed mutagenesis. Transfection of plasmids encoding HA-tagged CPA1 and various mutants into HEK293T cells resulted in poor expression of CPA1 lacking a prodomain, but preliminary results showed increased expression upon the transfer to this protein of two specific residues necessary for CPO folding. These studies will help us to determine the mechanism by which CPO folds without a prodomain, and so further our understanding of protein stability and folding.

M-32

Zoe Shiu (Psychology⁺)

Perfectionism and self-compassion on burnout in music majors

Musician burnout is receiving growing attention within the music community, particularly in universities and conservatories where music students juggle rehearsals, performances, lessons, and classes. While relatively few studies have explored burnout factors among music majors, research among athletes points to maladaptive perfectionism as a potential predictor of burnout and self-compassion as a potential protector against it (Amemiya & Sakairi, 2020; Eklund & DeFreese, 2015). Given the similarities between athletes and musicians in their commitment, performance, and competition (Pecen et al., 2016), this study explores whether perfectionism and self-compassion have similar effects on burnout for music students. I administer an online survey recruiting 100 total music majors from four private universities and through snowball sampling. I will run a relative importance analysis to determine the strongest predictors of burnout, followed by a moderation analysis of self-compassion. I hypothesize that (1) time spent in sleep, exercise, and relaxation will negatively predict burnout, (2) maladaptive perfectionism will positively predict burnout while adaptive perfectionism will negatively predict it, and (3) self-compassion will serve a protective role in preventing burnout. The findings of this study will provide a richer understanding of burnout, helping music educators and students find practical ways to prevent it and live sustainably.

M-33

Davielle Smith, Devin Garcia, Justyce Goode, Yamil Kas-Danouche, Anthony Bosman (Mathematics⁺)

Self and mixed Delta-moves on Algebraically Split Links.

A link is an embedding of circles into 3-dimensional space. A Delta-move is a local move on a link diagram. The Delta-Gordian distance between links measures the minimum number of Delta-moves needed to move between link diagrams. We place restrictions on the Delta-move by either requiring the move to only involve a single component of the link, called a self Delta-move, or multiple components of the link, called a mixed Delta-move. We prove a number of results on how (mixed/self) Delta-moves relate to classical link invariants including the Arf invariant and crossing number. This allows us to produce a graph showing links related by a self Delta-move for algebraically split links with up to 9-crossings.

M-34

Amelia Stefanescu, Sonia Badenas, Stephanie Carpenter, (Language & Literature)

Maleficent (2014), the Glorification of Evil in Modern Portrayals of Fairy Tales.

The story of Sleeping Beauty, adapted and changed throughout the ages, has seen many different versions, each of them reorienting the meaning of the story. It is not until recently that we have seen a version from the perspective of the story's villain in the movie Maleficent (2014), in which she justifies her traditional evil actions and refuses to fill in the role of the typical villain. I will argue for the creation of a new genre of film that seeks to justify evil and reveal the "hidden story" of a now morally-gray character instead of a cold-hearted, one-dimensional villain. By comparing and contrasting Sleeping Beauty (1959), the Disney animated film, and Maleficent (2014) through their respective interplay between good and evil, as well as how the role of Maleficent evolves from a villain to a savior, it is understandable that a giant shift has occurred in the world of fairy tales and film. This shift can very well be attributed to advancements in modern psychology, which have made people see others in gray rather than black or white, as a product of the many events of their lives rather than as a villain or a hero. This new genre of film adaptation is suitable for a public like today as it validates the needs of this generation's belief in gray characters and reflects how they see themselves

M-35

Christina Stowell (Psychology⁺)
Because It's Who I Am: Persistence and Personality.

Purpose: Persistence has primarily been associated with grit; however, persistence also correlates with constructs in personality, social, and cognitive psychology. We will examine five of these constructs (motivation, time management, locus of control, procrastination, and perfectionism) in addition to five personality traits.. Procedure: Participants will complete an online survey with 54 items measuring persistence and possible personality, social, and cognitive correlates. We will examine the pattern strengths of relationships using network analysis to better understand persistence's position relative to other psychological concepts. Expected Results: After conducting the study, we predict a moderate to strong positive correlation between persistence and conscientiousness and no relationship with other personality traits. We also predict a strong positive relationship with time management. We predict that persistence will be strongly positively correlated with motivation and perfectionism, moderately positively correlated with locus of control, and weakly negatively correlated with irrational procrastination. Implications: Expanding the research surrounding persistence allows for further support of Howard and Crayne's definition that persistence is a multidimensional explanation for why people continue tasks.

M-36

Maya Sukumaran, Benjamin Navia (Zoology⁺)
Effects of Male Exposure on Female Cricket Phonotaxis

Phonotaxis defines the ability of an organism to physically respond to an auditory stimulus. Pheromones are defined as excreted/secreted chemical signals that evoke a response in organisms. Both phonotaxis and pheromones are tools that aid communication and reproduction within species. Phonotaxis has been studied in the female cricket *Acheta domesticus*. It has been shown that factors such as age, hormones and temperature can affect phonotaxis in these animals. Pheromones remain to be assessed on its putative effect on cricket phonotaxis. This study investigates the possible effects of pheromones on cricket phonotaxis. Virgin female crickets were exposed to male crickets, but were restricted from mating. After exposure, the virgin female crickets were phonotactically tested. Results show that exposure to males alters the selectivity of females, causing a decrease in responsiveness. Implications of results will be discussed.

M-37

Padma T. Uppala, Nicole Boddeti, Guru Uppala, Sharon Lum (Loma Linda University), Brian Wong (Health & Human Services⁺) *Metabolic syndrome and dietary assessments among African American women.*

The emergence of the obesity epidemic worldwide is associated with increases in metabolic syndrome (MS), type 2 diabetes, and cardiovascular disease. The purpose of this study was to find an association between metabolic syndrome and dietary patterns among those with metabolic syndrome and those without MS among African American women. Methods: 41 African American women were enrolled into the study. Women completed a demographic and breast cancer survey. Twenty-three women completed a validated food frequency questionnaire. CardioChek Analyzer was used to measure metabolic syndrome blood parameters. IBM SPSS v.26 was used for statistical analysis. Chi-square tests were used for categorical variables. Kruskal-Wallis one-way analysis of variance was used for nutrient variables Results: The age of the study population ranged from 23 to 84. The mean body mass index was 30.8 and mean fat percent 41.57. There was a significant difference in the following nutrient intake among those with metabolic syndrome and those without MS. Total fat (p=0.015), Cholesterol (p=0.031), Total MUFA (p=0.016), Total PUFA (p=0.023), and Sodium (p=0.034). Conclusion: Significant differences were found in MS and nutrient intake between the two groups. Further studies will include larger sample size to establish the relation between metabolic syndrome and dietary patterns among African American populations. Study funded by Faculty Research Grant, Andrews University.

M-38

Terika Williams (Language & Literature⁺)

Rejecting kleos as a nation-building tactic: comparing the (Iliad) and the (Aeneid) to critique Italian colonialism.

With the sudden displacement and diminished status that comes from losing the Trojan war, the Trojans in Virgil's Aeneid strive to recreate home and rewrite themselves as the winners; however, they essentially perpetuate the same violence they experienced against the Latins and themselves. By using David Quint's idea of "positive repetition", the Trojans use kleos: glory or reputation, originally employed by the Greeks, to define themselves. The imperial might that kleos often requires, explained by Simone Weil, cannot provide the identity they seek. The consequences of kleos lead to self-harm as seen through Aeneas' reenactment of Achilles' initial departure from the Trojan war, Achilles and Aeneas' bereavement of Patroclus and Pallas' deaths and lastly, Aeneas' fight with Turnus in the Aeneid, as it parallels his battle with Diomedes in the Iliad. I utilize the term quasi-positive to illustrate that a stable national identity cannot be formed through kleos and might. The Aeneid, oftentimes viewed as a national epic for Italy, maintains destructive views that justify colonial and imperial agendas. With the information provided by Joanna Sondag-Cedarmas, Dorota Pietrzyk-Reeves, and Samuel Agbamu, I will show how modern-day Italy upholds the damaging ideals from the epic poems and the inevitable ramifications.

M-39

Sarah Wolf, Christine Choi, Elim Choi, Jasmine Cha, Min Seo Kang, Jessica Yi, Allana Benjamin, Rekha Isaac, Ryan Hayes, Padma T. Uppala, Brian YY Wong, (Chemistry & Molecular Biology⁺)

Induction and modulation of apoptosis in pancreatic adenocarcinoma BxPC-3 cells by Chinese medicinal herb (Scutellaria barbata) and (Oldenlandia diffusa).

Pancreatic cancer is usually symptom-free during development and is advanced by the time of diagnosis with a poor prognosis. BxPC-3 is a pancreatic adenocarcinoma cell derived from a 61-year-old female. Scutellaria barbata (SB) and Oldenlandia diffusa (OD) have been used in traditional Chinese medicine for treating colon, liver, lung, and rectal cancers. In this study, the effectiveness of SB and OD in apoptotic modulation of BxPC-3 was investigated using the green/red/blue fluorescent Apoptosis/Necrosis Detection Kit and the Human Apoptosis Antibody Array - Membrane (43 Targets) Test by the Abcam cooperation. Our data showed that a 2-hour treatment with 2.5 mg aqueous extract of SB and OD induced a statistically significant percentage of apoptosis in BxPC-3 cells respectively. Regulation of various pro-apoptotic and anti-apoptotic proteins was also observed in these cells with the incubation of these two Chinese medicinal herbs. These results suggest that SB and OD contain phytochemicals that induce apoptosis in BxPC-3 cancer cells via the modulation of these pro-apoptotic and anti-apoptotic proteins. Further study of the specific mechanisms of these phytochemicals of SB and OD on the apoptosis of BxPC-3 is warranted to reveal its potential chemopreventive and therapeutic properties against pancreatic and other cancers.

M-40

William Yoong, Hyun Kwon (Engineering⁺)

State of health prediction of Lithium-ion battery using deep learning strategies and LSTM.

Accurate prediction of Lithium-ion (Li) cell state of health (SOH) is crucial for battery management and safety since cells degrade from repeated charge-discharge procedures. For this study, data driven machine learning methods were used to estimate SOH of a set of Lithium-ion cells using data from the NASA Ames Prognostic Center of Excellence. Conventional machine learning approaches utilize selected features to produce models, but this research utilized the time series of cycle data without extracting features. The data was validated and tested with 5 fold cross validation. It was found that combining principal component analysis (PCA) with deep learning methods resulted in good SOH estimation (RMSE < 0.035) while still keeping training time manageable. A long short term memory (LSTM) method was also applied. The LSTM was trained utilizing 80% of the voltage time series data, with the remaining 20% reserved for validation and testing. The LSTM architecture consisted of a sequence input layer which accepted the time series data, a LSTM layer with 100 hidden units, a fully connected layer, and a regression output layer. Compared to the deep learning methods previously used, LSTM models were significantly more resilient when given smaller amounts of training data and showed superior generalization.

M-41

Guoxi Zhang, Melissa Ponce-Rodas (Psychology⁺)
Exploring the Relationship between Religiosity and Domestic Violence Awareness.

While research on domestic violence has significantly increased in the past few decades, very little has explored how religiosity impacts perceptions of domestic violence. The current study will build on pilot data that found gender role beliefs are correlated with both religiosity and definitions of domestic violence. We will expand on the pilot study, by assessing a specific form of religiosity – religious internalization, a variety of gender roles, and whether these impact definitions of domestic violence in a college student sample. These measures with greater specificity, will help to inform the literature on understanding a potential cognitive pathway by which religion and gender role beliefs impact perceptions of domestic violence. This work may also provide implications for future prevention work with religious groups, which will be discussed.

M-42

Konstantin Zubkov, Terika Williams, Peter J. Lyons (Biochemistry & Molecular Biology⁺)
Purification of human carboxypeptidase O for analysis of its role as a folate hydrolase.

Carboxypeptidase O (CPO) is an enzyme which is believed to play a role in the digestion of proteins and peptides in the small intestine. However, previous work has demonstrated the cleavage of glutamate-extended folates by CPO, implying similarity of function to another enzyme, folate hydrolase. The purpose of this study was to assess the potential overlap of function of CPO and folate hydrolase through an analysis of common substrates and inhibitors. Purified zebrafish CPO (zCPO) was used in initial studies, with glutamate-extended folates found to stimulate the enzymatic activity of zCPO. In order to further study the function of CPO, purification of human CPO (hCPO) was necessary. A plasmid expressing His6-tagged hCPO was transfected into Sf9 insect cells and the resulting media containing high-titer virus was used for subsequent Sf9 infections. Expression of hCPO-His6 was tested by western blotting, demonstrating the presence of hCPO-His6 in conditioned cell media. hCPO-His6 was purified from conditioned media using TALON metal affinity chromatography. Successful purification of hCPO-His6 was demonstrated by SDS-PAGE followed by Coomassie staining. The acquired material allows for further research into the functional similarities of hCPO and folate hydrolase.

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