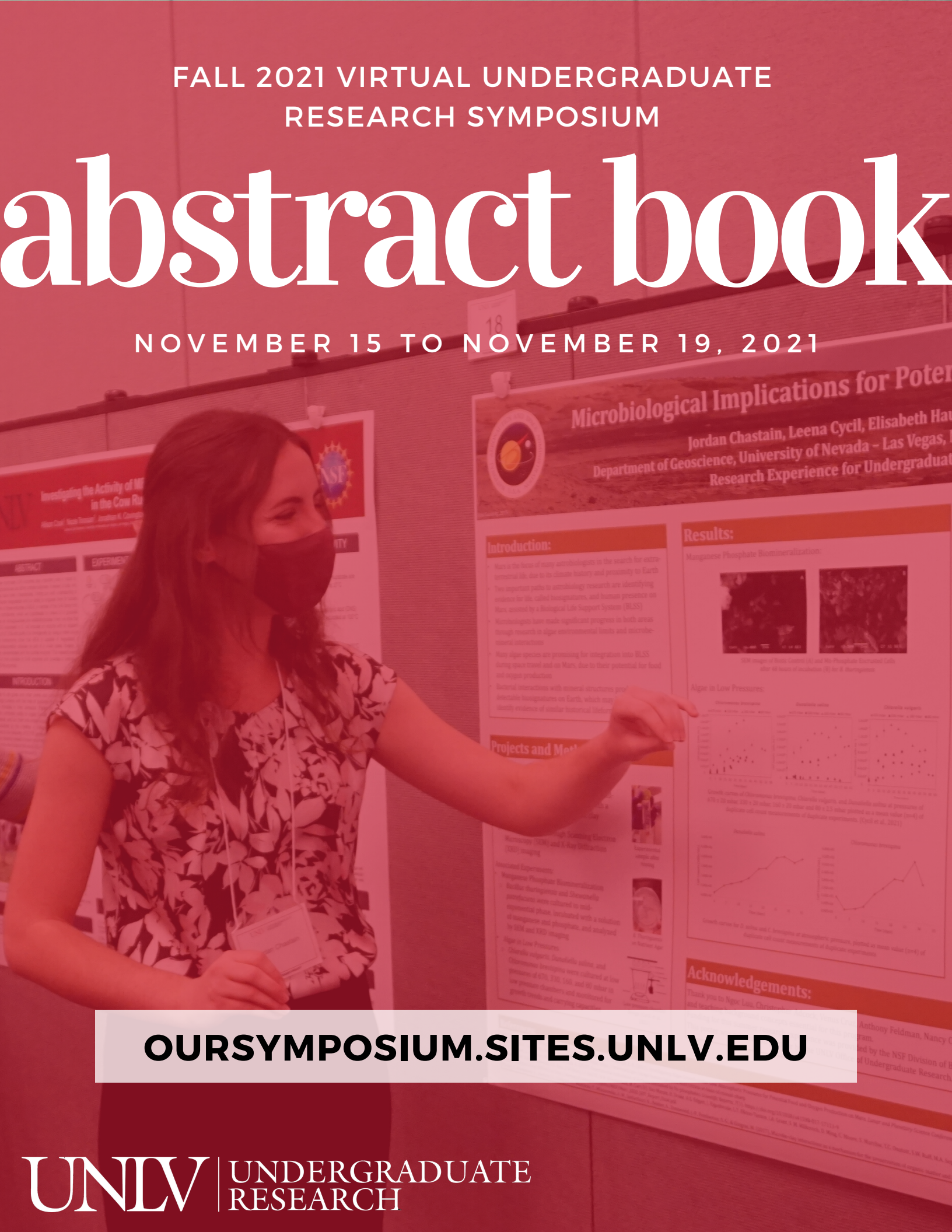
FALL 2021 VIRTUAL UNDERGRADUATE RESEARCH SYMPOSIUM

abstract book

NOVEMBER 15 TO NOVEMBER 19, 2021



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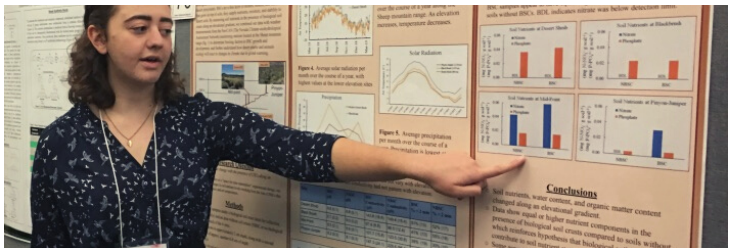
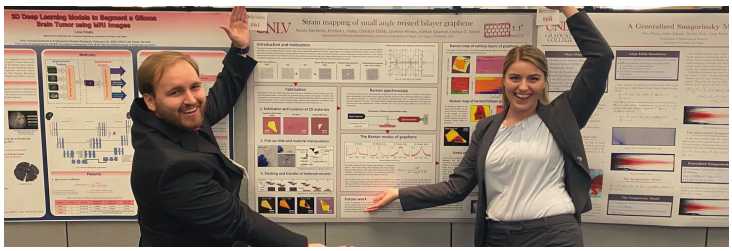
UNLV | UNDERGRADUATE RESEARCH





Opening Remarks

Edmund "Ed" Synakowski, Ph.D., Vice President for Research

Greetings, my name is Ed Synakowski and I have the privilege of serving as your vice president for research here at UNLV. I am more than pleased to be part of the celebration of undergraduate research. I commend you for your participating in undergraduate research here. My high praise for what you do comes from my own experience. I was an undergraduate well before there were programs like this, but I had the good fortune of having work study eligibility. This got me on campus, out and about looking for a part-time job as a sophomore and I found one. A professor brought me aboard to his physics laboratory doing basic electronics and making mistakes while I learned a bit about spectroscopy. That experience set my career direction in plasma physics and fusion energy research. But even if it hadn't, the outcome would have been life-changing. One, it revealed to me what kind of work environment I liked and could thrive in. For me, I loved being in a collegial group and so I sought out environments in graduate school like that. It revealed to me the nature of research – the fits and the starts and the frustrations – and then the victories as you begin to crack open problems and begin to see the world for how it really is. I found this happening in my own sphere and also as an observer embedded in a group of talented graduate students, post-docs, and technicians. Mostly though, my hope for you is that you get from this experience the sort of thing that I did. Namely, coming to know that through a combination of grit, tenacity, and support from one's research group, which really is a community when you think about it, that you have a capacity to learn for yourself, to contribute, and to change things for the better and that is fundamentally deeper and different than what it was before you began your research.

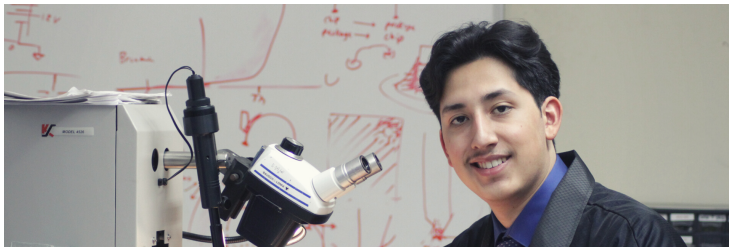
I believe that through the research experience, you will come to understand that you can navigate your way, think flexibly, problem-solve, and thrive in a complex world. I came to understand that I didn't need to be on the sidelines, but rather, that I could be a full participant in my lab, in my community, and more broadly than that. The potential of the research experience telling us all that we can thrive in a world that sometimes seems to be only full of threats is an exciting and important prospect and it's a primary reason why my office is so pleased to be supporting you in this symposium and beyond . The fact that UNLV has such a strong undergraduate research enterprise was one of the draws for me in taking my new job.

I think of research — be it the STEM-fields, the arts and humanities, or elsewhere — as the ultimate in experiential learning platforms because there is no better way of coming to expand and know your own capacity at performing research.

I am so pleased to be part of a campus where students such as yourselves are creating their own path for research, learning about yourselves as you learn about the world. The range and depth of the research you are conducting and the research methods you are learning extend far beyond anything I have the good fortune of being part of. Now you are participating in an essential component of this in this symposium. That component is the act of communicating your experience and findings and making yourselves vulnerable to give in take. That is essential to the advancement of research in any discipline.

I am grateful for your efforts, your tenacity, and including your willingness to share here and the continued commitment of Professor Levent Atici and his team. I'm also grateful for the faculty and other research mentors who are supporting you. Please believe me when I say that you are serving you and your futures very well by your effort regardless of the research outcomes you're uncovering.

It's a point of pride that UNLV graduates so many who have had a research experience that has helped them forge their own understanding of the nature of the world. Beyond that as well, their own capacity to understand and affect change for the better. I extend my very best wishes for a successful symposium.



Opening Remarks

Levent Atici, Ph.D., Executive Director of Undergraduate Research

Greetings, fellow researchers! My name is Levent Atici and I am the Executive Director of Office of Undergraduate Research. Today, I'm profoundly privileged and honored to welcome you all to the week-long and immersive Fall 2021 Virtual Undergraduate Research Symposium brought to you by the Office of Undergraduate Research and its talented team. I would like to recognize and commend OUR's Dr. Rafael Oganesyan, Ms. Susan Hall, and Ms. Kira Tran for their excellent work.

I also would like to recognize our partners from UNLV's Center for Academic Enrichment and Outreach and namely identify my colleagues, Drs. Keith Rogers and Matt Dellasalla for their contributions to this event and for their commitment to research education at UNLV.

As you can imagine the COVID-19 pandemic has deeply affected everyone's ability to pursue business as usual. We are just concluding another fall term, unlike any other in recent memory, despite all the challenges. We, the undergrad research community, led by our faculty, continue to expand, enhance, and advance undergraduate research education at UNLV. As such, I would like to passionately commend UNLV's dedicated faculty research mentors who now have a tested commitment to excellence in teaching and research during these trying times. We're proud to celebrate the outstanding research you conduct with your undergraduate student mentees and colleagues in the making.

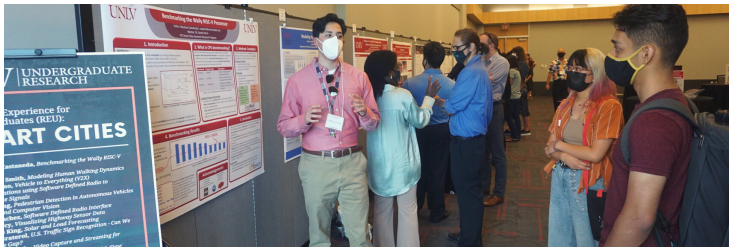
I would also like to express my most sincere gratitude to President Whitfield, Provost Heavey, and Vice President for Research Synakowsky for strongly endorsing undergraduate research education at the highest level at UNLV.
Fellow researchers, 21st century challenges require 21st century skills such as critical thinking, creativity, and problem solving since there has been a shift in perspective from content base, conventional learning to experiential, active or discovery learning to bridge the gap between academia and the real world. We all live and function in a complex and globally connected word and our students ability to ask the right questions, locate evidence, evaluate findings, be critical of concepts, claims, and arguments, judge credible knowledge and form sound and inform decisions now is most imperative than ever given the sheer size of digital data that are instantly and globally available, accessible and multiplied every second by numerous digital outlets.

This is where undergraduate research comes to play and provides rich programs to help our students develop all of these critical skills leading to cognitive, behavioral, and psychological gains.

With 230 undergrad researchers from diverse backgrounds and from the entire spectrum of degrees offered at UNLV, our Fall 2021 Virtual Undergraduate Research Symposium epitomizes research at UNLV in the broadest, most inclusive, transdisciplinary, and collaborative sense to bridge the gap between content learning and discovery learning. UNLV is now recognized as one of the nation's top research universities, and our faculty and student researchers generate not only headlines and high impact research, but also current, relevant, and community-based research outputs.

I am most impressed and proud to see how in recent years most of our students have applied their skills to addressing such critical agendas as crises brought on by the pandemic, social injustice, and climate change. Today and tomorrow, we are here to support you as you embark on your research journey. Today, we are here to celebrate your accomplishments.
It's all about you!

Thank you for presenting your research or simply just attending the Fall 2021 Virtual Undergraduate Research Symposium and for giving us the opportunity to be a part of your research journey as the leaders, innovators, and pioneers of the future to push the boundaries of knowledge. At UNLV's OUR, we say YES to undergraduate research and we invite you to join us! Thank you.



Opening Remarks

Keith Rogers, DBA, CAEO Deputy Executive Director

Hi, my name is Keith Rogers and I am the Deputy Executive Director for UNLV's Center for Academic Enrichment and Outreach, also known on campus as CAEO or The Center. CAEO hosts multiple federally funded college opportunity programs that aim to assist students who qualify as low-income, first-generation, and/or underrepresented in higher education to be retained and ultimately graduate from UNLV. These programs include TRIO Student Support Services, TRIO McNair Scholars Institute, Title III AANAPISI, and National Science Foundation's Louis Stokes Alliance for Minority Participation. This academic year has been unprecedented. The Center was fortunate to fund and support more than 50 undergraduate students to conduct research under the guidance of professors here at UNLV. I want to thank our students for their resiliency in enduring through the pandemic to finish their research projects. I also want to thank our faculty mentors for their work with our students, especially given the difficult circumstances of the pandemic. This would not be possible without the generous sponsorship from the U.S. Department of Education and National Science Foundation for their financial support of these students and our institution. Please take time to watch students' poster videos and leave comments and/or feedback. Thank you.

Schedule of Events

Keynote Speakers:

Pamela C. Burnley, Ph.D.

Elizabeth Stacy, Ph.D.

Kevin Ayala Pineda

Vanessa Booth

Academic Program

Awards Ceremony

Session Finalists

Award Winners

Acknowledgements

FALL 2021 VIRTUAL UNDERGRADUATE RESEARCH SYMPOSIUM

BY THE NUMBERS

95 POSTER PRESENTATIONS

18 LIGHTNING TALKS

24 PODIUM PRESENTATIONS

1 PERFORMANCE/ EXHIBITIONS

223 UNDERGRADUATE STUDENTS PRESENTING RESEARCH

138 UNDERGRADUATE STUDENT RESEARCH PROJECTS

16	3	6	23	186	5
HS STUDENTS	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR	POST-BACC

97 FACULTY RESEARCH MENTORS

12 COLLEGES

32 DEPARTMENTS

49% ARTS, HUMANITIES, & SOCIAL SCIENCE PROJECTS

51% HEALTH & NATURAL SCIENCES & ENGINEERING PROJECTS

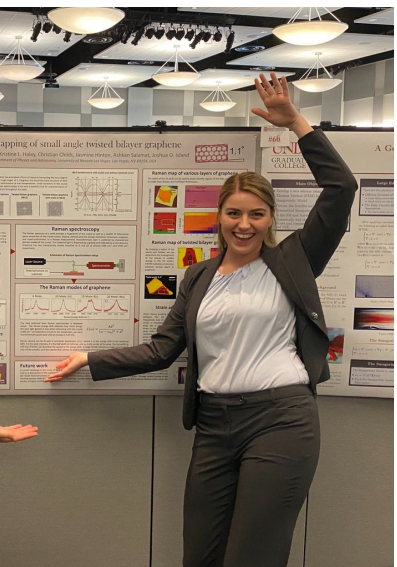
BY RACE

2%	12%	32%	24%	23%	7%
AMERICAN INDIAN	AFRICAN AMERICAN	ASIAN	HISPANIC	WHITE	REFUSED TO DISCLOSE

61% FEMALE PRESENTERS

38% MALE PRESENTERS

1% REFUSED TO DISCLOSE



OREO-4. Eco-Friendly or Deceitful Branding: The Implications of Energy Corporations Greenwashing in the United States on Climate Change

Sarah Park[1]
Faculty Mentor: Levent Atici, Ph.D.[2]
[1]Ed W. Clark High School
[2]Division of Research, Office of Undergraduate Research

ABSTRACT
Presented in this study, is an in-depth analysis of the effects of energy companies greenwashing while focusing on the challenges that the status quo presents in transparency of companies' environmental actions in a policy viewpoint in the United States. The purpose of my research was to see how combating climate change has been complicated due to energy corporations greenwashing in the US. The data in this study primarily focuses on self-conducted research through case studies, predicted company greenwashing rate, the current scope of deceitful tactics, current obstacles companies face towards becoming environmentally friendly, current emissions by energy companies, policy to create tangible change, current state of play of climate change, and more. The scope of the study calls into question the ethics of brands that seek to make a profit while sacrificing the health of their consumers. Research methodologies in this study include but are not limited to, mixed-methods like data conduction, case studies, data analysis, interpretation, observations, and archival research. These results suggest that current energy companies are deceiving their consumers and are not being regulated enough by the government, policy wise. Along with this, such companies are spending a significant amount of lobbying, avoiding specific regulation. On this basis, the concept of greenwashing should be taken into account when actively trying to investigate a company's environmental friendliness. The findings of this study indicate that there needs to be increased transparency within company policy and tangible change enacted by the federal government to hold energy companies accountable to mitigate climate change.

OREO-5. Constructing the African American Drug Criminal in America

Patrick Dimasin[1]
Faculty Mentor: Levent Atici, Ph.D.[2]
[1]West Career and Technical Academy
[2]Division of Research, Office of Undergraduate Research

ABSTRACT
Historically, African American people have had an implicated relationship with the criminal justice system: higher arrest rates, higher conviction rates, and worse sentencing results are common, especially in drug-related crimes. In this study, I aim to identify the relationships of the social environments of participants in two categories, race and gender. Using the contact and threat hypothesis, I seek to analyze the correlation between positive and negative attitudes of "outgroup" individuals and the perception of what a "violent" criminal appears to be. Results from previous studies have affirmed that increased intergroup contact increases positive attitudes, but an increasing size of an ethnic outgroup increases the risk factor for negative attitudes like threat perception. Using a phenomenological foundation, I was able to conduct correlational research that found increased intergroup contact is more likely to lead to more "violent" perceptions of darker-skinned, male, drug-related criminals. These findings strongly suggest that threat hypothesis has a strong potential in controlling subconscious biases towards varying ethnic groups, and has a future in determining whether these findings hold true in other categories of crime. I suggest that if the threat hypothesis is true for public perception of criminals, then these results should provide a foundation for further inquiry of threat hypothesis'.

OREO-6. Most Effective Advertising Methods

Shazray Akbar[1]
Faculty Mentor: Levent Atici, Ph.D.[2]
[1]The Meadows School
[2]Division of Research, Office of Undergraduate Research

ABSTRACT
Advertising is a critical part of gaining traction for companies, so researching and utilizing the best forms and tactics in advertising have been a major part of growth and creating a consumer base. This study aimed to investigate the most effective form of advertisement that can successfully make a lasting impact on consumers and urge them to buy the product being advertised. When analyzing data over popular advertisements with high success rates in recent years, one form of advertisement stands out, with an effective tactic also being highlighted. When regarding form, online advertising, especially in today's day and age, has the greatest impact on consumers, and such ads easily can be found while browsing popular sites and social media. These ads are repeatedly cemented in consumers' brains, and with an increasingly interconnected world with a high level of internet usage, online advertising has become a more popular form of advertisement. Companies which advertise online are able to target their products towards demographics which are more likely to purchase their goods through using available data and search histories, being more effective for their investment when compared to broad, in-person advertising. Aside from form, one tactic that more directly relates to video advertisement is ads which invoke a sense of "relatability". Companies create a story in which consumers can easily identify with, strengthening consumer response. By using online advertising and creating relatable ads when advertising in video format, companies are shown to have more effective ads which create a larger consumer base.

OREO-7. Political Bias Derived From Social Media Platforms Influencing Financial Decisions

Yee Tay[1]
Faculty Mentor: Levent Atici, Ph.D.[2]
[1]Advanced Technologies Academy
[2]Division of Research, Office of Undergraduate Research

ABSTRACT
The research described in this paper seeks to answer the question "What aspects of social media make it more likely for an investor to make a financial decision?". This study aims to analyze what partisan indicators influence a certain political ideology more and how that affects their financial decisions, specifically when buying and/or selling stocks through employing a qualitative method semi-structured interview. The semi-structured interviews are then coded in order to find the most prevalent themes and patterns. Results have found that more explicit labeling of partisan indicators is desired and initiatives taken by social media platforms to promote transparency increased trust. Other than answering the question, this study can help to provide insight to social media platforms on how to create more nonpartisan news feeds which would help Americans make better financial decisions. This information could also be utilized by investors, marketers, and anyone else who is interested in understanding why certain political ideologies make the financial decisions that they do.

OREO-8. The Quality and Accessibility of Child Suicide Prevention Resources

Gianna Archuleta[1]
Faculty Mentor: Levent Atici, Ph.D.[2]
[1]Advanced Technologies Academy
[2]Division of Research, Office of Undergraduate Research

ABSTRACT
In wake of the Covid-19 Pandmeic, many concerned parties have called into question the mental health of students and children across the country due to extreme isolation. However, even before the pandemic, suicide rates among children 5-12 have been on an unprecedented rise. Not to mention, the current general belief that kids shouldn't have mental health issues due to their age. In this analysis, suicide prevention resources made specifically for children were examined for their availability and efficiency in Nevada. Results showed that there were not many practical and available resources available specifically for children. Program training seemed to be available for staff, but programs dealing with children directly have little data or research. We conclude that children's suicide is not being made a priority in a time when proper mental health and emotional regulation skills are incredibly important.

AHS-E1-1. May Death Never Stop You

Logan Strong[1]
Faculty Mentor: Jennifer Bellor, Ph.D.[2]
[1]Howard R. Hughes College of Engineering, Department of Civil and Environmental Engineering and Construction
[2]College of Fine Arts, School of Music

ABSTRACT
May Death Never Stop You, sharing its name with the My Chemical Romance greatest hits album, is a jukebox musical based on a modernized adaptation of William Shakespeare's Hamlet, using music spanning the career of My Chemical Romance. The goal was to produce a film of this musical that can be used by teachers to aid when teaching Hamlet. The final product is a shooting script as well as scores to all of the arranged songs, and a demonstration scene for presenting the concept. The music was chosen to align thematically with Shakespeare's story, and to lyrically express the play's plot. The medium of film was chosen to optimize accessibility and to parallel the experience of watching the original play. The desired outcome is to help students better understand Hamlet in its original form, as well as to appreciate the songs of My Chemical Romance in an academic context. It will also demonstrate for young audiences the relevance of Shakespeare's works in the modern world.

AHS-L1-1. Teaching for Black and Brown Lives: The Importance of Ethnic Studies Curriculum in the Educational Success of Black and Latinx Students in Nevada

Kendra Beach[1]
Norma A. Marrun[1]
Averill Kelley[1]
Rosemary Q. Flores[1]
Lauren Patterson[2]
Faculty Mentor: Christine Clark, Ph.D.[1]
[1]College of Education, Department of Teaching and Learning
[2]College of Education, Department of Counselor Education, School Psychology, and Human Services

ABSTRACT

This study identifies school policies and practices that create a gap in support for Ethnic Studies for high school graduation, college graduation, and teacher licensures. The first method was interviewing specific stakeholders through zoom who were in the position for the purpose of the research. The interviewed participants answered questions about the policies related to Ethnic studies, practice school policies, and implications of the ratification of Ethnic study policies in Nevada. The second method was analyzing Nevada state and Department of Education policies relating to teacher education. Interpreting how UNLV teacher licensure programs apply those policies in the preparation curriculum. Results from the methods were initial findings were 75% of the student population in CCSD are students of color, but there are still limited clubs that surround racialized experiences. Although students who participated in racial/ethnic club activities led to more enrollment in elective courses. Ethnic studies are considered along with social studies and "diversity studies", which need to be differentiated from one another. Ethnic study courses can be a valuable enhancement to build cross-racial solidarity and create opportunities to make sense of school experiences. It is critical to make a foundation for success for Students of Color and Families of color in many schools and communities in CCSD.

AHS-L1-2. Visualizing the Southern Nevada Homelessness Crisis

Vanessa Booth[1]
Faculty Mentor: William E. Brown Jr.[2]
[1]College of Liberal Arts, Department of Political Science
[2]Brookings Mountain West

ABSTRACT
Presented in this policy study, is an in-depth analysis of the growing Homelessness Crisis occurring across the state of Nevada while focusing on the state of play scenario that the Las Vegas Metropolitan Area presents. The data synthesized in this study primarily focuses on predicted homelessness rates, the current scope of the homelessness crisis, housing affordability, accessibility to poverty alleviation services, alongside notable policy recommendations. The scope of the study calls into question the funding formula and allocations of federal funds to solve the current homelessness crisis. Research methodologies in this study include but are not limited to, several mixed-methods like policy data analysis, data interpretation, observations, and archival research. The findings of this study indicate that immediate policy remedies/solutions are needed to alleviate the exacerbating homelessness crisis in Southern Nevada.

AHS-L1-3. The Joestar Spirit: How the Protagonists of JoJo's Bizarre Adventure Embody Key Traits of the Hero

Tracy Fuentes[1,2]
Faculty Mentor: Amy M. Green, Ph.D.[1]
[1]College of Liberal Arts, Department of English
[2]College of Liberal Arts, Department of Political Science

ABSTRACT
Despite how much anime has grown in popularity over the decade and even more so this past year, studies on animes outside of Studio Ghibli's filmography remain minimal compared to the large amount of content available today. The complexity and artistry presented in anime make them worthy of literary analysis, and the anime Jojo's Bizarre Adventure is no exception to this. Jojo's Bizarre Adventure spans five parts consisting of different storylines, each with its own protagonist. This paper seeks to explore the anime Jojo's Bizarre Adventure as a literary work, and specifically examine how the characters compare to the typical hero and portrayals of masculinity. This character analysis argues that although the five protagonists of the anime are drastically different in personality and character, they all possess four basic traits of a hero: selflessness, bravery, a strong sense of justice, and the ability to succeed alone. Using the words of the creator of Jojo's Bizarre Adventure, Hirohiko Araki; evidence from the anime; and research on heroes and Japanese culture, this paper demonstrates how the five characters exemplify these heroic traits.

AHS-L1-4. Low-Income Job Loss in Washoe and Clark Counties

Katie Gilbertson[1]
Faculty Mentor: Djeto Assane, Ph.D.[1]
[1]Lee Business School, Department of Economics

ABSTRACT
This study analyzes the loss of low-income jobs in Washoe County and Clark County during June 2020 and August 2021. Nonessential business closures at the onset of the pandemic in March 2020 ravaged the labor market in Nevada, and the aftershocks are still being felt a year and a half later. Initial data were collected from the Urban Institute on June 5, 2020. At that time, 23,263 low-income jobs were lost in Washoe County and 132,771 low-income jobs were lost in Clark County. Final data were collected as of August 6, 2021, as that is currently the latest available information. Recent data reveals Washoe County has added back 14,773 low-income jobs and remains at a loss 8,490 jobs while Clark County has added back 70,916 jobs and remains at a loss of 61,855 jobs. This analysis measures the average difference of low-income jobs lost by county and year. Findings suggest that the differences between Washoe and Clark counties were more statistically significant in 2020 rather than 2021. Also, Washoe County had a higher statistical significance of its county-wide job loss from 2020 to 2021 than Clark did between the same years. Given these findings, the discrepancies between the two counties were more pronounced in 2020 and Washoe has added back low-income jobs faster than Clark. Future research should expand the time frame of the study or uncover why the majority of jobs are lost in Accommodation and Food Services.

AHS-L1-5. Coca-Cola Brand Attitudes Among UNLV Students

Debanhi Gutierrez[1]
Faculty Mentor: Eda Anlamlier, Ph.D.[1]
[1]Lee Business School, Department of Marketing and International Business

ABSTRACT
Students grow up with popular brand name food products that become universally familiar across households. These students form attitudes and perceptions towards these products and brands. In this research, we will look at the positive and negative attitudes that UNLV students associated with the Coca-Cola brand and Coca-Cola soda. This will be conducted through a quantitative survey that will account positive and negative attitude along with demographics. Results will show what attitudes UNLV students in Las Vegas have toward this brand and soda products. Ultimately, this research will give insight as to whether UNLV students regard this brand and product with more positive or negative attitudes.

AHS-L2-1. Teaching for Black and Brown Lives: The Importance of Ethnic Studies and Latinx Students in Nevada

Lauren Patterson[1]
Norma A. Marrun, Ph.D.[2]
Rosemary Q. Flores[2]
Averill Kelley[2]
Kendra Beach[2]
Faculty Mentor: Christine Clark, Ph.D.[2]
[1]College of Education, Department of Counselor Education, School Psychology, and Human Services
[2]College of Education, Department of Teaching and Learning

ABSTRACT
The purpose of this study was to examine Nevada state (NAC, NRS, NDE, etc.), UNLV(NSHE code, etc.), and CCSD policy and practices related to required and/or elective Ethnic Studies, multicultural education, and/or diversity coursework for high school student graduation, college student graduation, and teacher licensure, license renewal, and/or continuing education, in order to identify areas of confusion, conflation, weakness, and/or gaps in law and policy support that, if addressed, would lead to improvements in high school and college student learning outcomes and academic success (especially for Students of Color), and to the improved preparation of teachers(especially to effectively teach Students of Color).

AHS-L2-2. Expression Patterns of Integral Axon Initial Segment Proteins During Postnatal Cortical Development

Amanjot Kailey[1]
Rachel Ali Rodriguez[1]
Jeffery Barker[2]
Dustin Hines, Ph.D.[2]
Faculty Mentor: Rochelle Hines, Ph.D.[2]
[1]College of Science, School of Life Sciences
[2]College of Liberal Arts, Department of Psychology

ABSTRACT
A key site in the control of neuronal activity patterns is a specialized compartment known as the axon initial segment (AIS). The AIS is a highly organized neuronal compartment whose local density of proteins and morphology in part determine the firing characteristics of neurons. Recent studies have demonstrated that the AIS undergoes important modifications during development, but the molecular mechanisms that affect the development, composition, and morphology of the AIS remain obscure.
We are using western blotting to examine the developmental expression of proteins that are enriched in the AIS across a time course of cortical development, focusing on the time points of postnatal day 5, 10, 20 and adulthood. Using antibodies we are able to specifically detect bands of proteins separated by molecular weight. We analyze these bands to determine intensity of signals a proxy for expression level. We normalize the intensity measured for each protein band to the abundant cytoskeletal protein actin, which allows us to control for the amount of sample loaded. We have found that the AIS protein Neurofascin undergoes a shift in abundance of specific isoforms during postnatal development, presenting an interesting target for further study. Understanding of the developmental regulation of AIS proteins has implications for understanding the development of cortical firing patterns and ultimately for disorders of cortical development.

AHS-L2-3. Deception in Romantic Relationship

Makayla Kolojay[1]
Faculty Mentor: Natalie Pennington, Ph.D.[1]
[1]Greenspun College of Urban Affairs, Department of Communication Studies

ABSTRACT
Romantic Relationships are an important part of an individual's life; having a partner can help us feel secure, bring joy, laughter,commitment, emotional and physical intimacy. While focusing on communication inside romantic relationships, this study is focused on the role deception to promote relational satisfaction. Deception is a conscious attempt to create or perpetuate false impressions. I bring attention to existing research about deception to understand the effects it has on how happy someone is within their relationship. This project I will talk about the multiple motives behind deception, such as lying and interpretation. It will also include intentional and unintentional motives. Essentially, deception can be a positive and negative thing, and I will discuss the best intentions for helping relationships.

AHS-L2-4. A Study on Improvement of Mobile App for UNLV: Campus Safety Protocol in User Experience

Kristine Monsada[1]
Mustafa Diallo[2]
Cecilia Garcia-Leon[2]
Mayra Carrera[2]
Khristine Le[2]
Faculty Mentor: Sang-Duck Seo, Ph.D.[2]
[1]Howard R. Hughes College of Engineering, Department of Computer Science
[2]College of Fine Arts, Department of Art

ABSTRACT

According to The National Center for Education Statistics (NCES), an average of 28,000 crimes were reported on college campuses across the United States in 2019. However, while many universities offer services to help students stay safe while on campus, students continue to feel unsafe.

The University of Nevada Las Vegas's (UNLV) proximity to the Las Vegas Strip causes campus to be vulnerable to crime. While UNLV offers students safety resources through their campus safety app, 'RebelSafe,' we found that only a small percentage of UNLV students actually use the app and wanted to pinpoint why. Thus, we focused our research on improving the usability and User Experience (UX) of this existing campus safety application by redesigning the app and conducting usability tests with the redesign.

To test the effectiveness of the new redesign, our empirical study consists of three tasks for participants to execute: contacting police, requesting safety escorts, and accessing other safety resources. The findings from the usability testing help us analyze the difficulties users experience from the prototype. They also help us determine areas that are working and areas that need improvement.

By focusing on the improvement of the existing UNLV RebelSafe mobile app, this study intends not only to specify an effective user interface design that fits into emergency protocol procedure but also to clarify the campus safety resources through a single mobile application.

AHS-L2-5. The Bronze Head of Thracian Ruler Seuthes III

Andrea Rangelova[1]
Faculty Mentor: Aya Louisa McDonald, Ph.D.[1]
[1]College of Fine Arts, Department of Art

ABSTRACT
In 2004 Bulgarian archeologists, Dr. Kitov and Dr. Dimitrova, discovered a unique Hellenistic era bronze head in a Royal Thracian burial, outside the Golyamata Kosmatka tomb. Research and visual analysis has shown that this head is most likely a portrait of Seuthes III, the ruler of Odrysian Thrace. This identification is indicated by its close resemblance to realistically sculpted profile images of Seuthes III found on Thracian coins. In both cases the heads are characterized by a thick beard and a crooked nose, which create a singular, individual identity. Traditional Greek bronze heads around 4 B.C. are beardless.
The head is a masterpiece of Hellenistic realism, dated to c. 4th Century BCE. The archaeologists further suggest that the bronze head of Seuthes III played a significant part in spiritual rituals of the Odryssian Thracians. Further objects inside the Golyamata Kosmatka tomb reveal the substantial influence of Hellenistic Greek art: a silver pitcher, a silver vial, a gold wreath with oak leaves, and a bronze helmet engraved in Greek script with the name of Seuthes III. Fragmentary images of the Gorgon Medusa were found on the funeral bed and the bronze helmet. We conclude that the bronze head of Seuthes III is unique and has no analog in the Greek World.

AHS-O1-1. Perceived Racial Discrimination, Black Lives Matter, and Political Participation in 2020

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ABSTRACT
This study aims to investigate the impacts of Black Lives Matter protests and perceptions of racial discrimination on political participation in 2020. Survey responses from the 2020 Collaborative Multiracial Post-Election Survey are matched with data on protest locations across the United States. Regression models test the effects of the aforementioned two independent variables on political engagement. A third question tests the interactive effect between Black Lives Matter protests and perceptions of racial discrimination. The results of this study show statistically significant results for Black respondents; Black Lives Matter protests and increased perceptions of racial discrimination both have a positive relationship with political participation. The interaction between the two independent variables shows a negative overall relationship with participation, but results vary based on an individual's perception of racial discrimination. This study does not yield statistically significant results for non-Black respondents, indicating that these two concepts have greater impacts on Black communities.

AHS-O1-2. Climbing the Social Ladder: Asian American Education and Social Mobility Across the United States

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ABSTRACT
As the fastest-growing ethnic group in southern Nevada, Asian Americans comprise 8.6% of Nevada's population and 10.28% of Clark County's population (U.S. Census Bureau, 2010). Despite the rapid growth of the Asian American community in southern Nevada, Asian Americans are constantly facing obstacles that inhibit them from moving up the socioeconomic ladder mainly due to the lack of opportunity, policies, and resources. This research paper examines whether education influences socioeconomic advancement of Asian Americans, and whether the relationship between the two variables is conditioned by other factors, including social capital. A secondary goal is to examine whether the relationship between education and social mobility varies among different sub-groups of Asian Americans, including South Asians. Lastly, the thesis offers simple, tangible solutions to these problems. The research methodology of the thesis drew on analysis of recent, empirical studies by scholars who have examined and documented the determinants and levels of socioeconomic levels and educational attainment of Asian Americans in the United States. The thesis also provides an empirical analysis that are based on data from the Asian American Survey, which is a representative sample that includes data on educational attainment, social capital, and various ethnic and immigrant groups, including different Asian American sub-groups. The main findings of the research thesis indicated that education provides critical skills for social mobility as it provides individuals more leverage in the labor market in order to earn a higher salary.

AHS-O1-4. The Gender Wage Gap as it Relates to State Partisan Control and Pay Equity Policy

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ABSTRACT
This study offers an explanation to the interstate variation of the gender wage gap in the United States. Looking at political explanations as an answer for the wage gap's persistence, I hypothesize that Democratically controlled state government positively impacts the state having pay equity policies, and that having these pay equity policies positively impacts the state's gender wage gap. Using U.S. Census Bureau, National Conference of State Legislatures, and American Association of University Women with U.S. Department of Labor Women's Bureau data, I find that while there is a correlation between Democratically controlled state legislatures and pay equity policy and a correlation between Democratic majority legislatures and a narrower gender wage gap, there does not appear to be a direct association between pay equity policy and the state's gender wage gap. The findings suggest that partisanship of the state legislature plays a key role in the wage equity policy of a state, as well as the reasoning that longstanding Democratic majorities have already passed policy to combat the apparent causes of the gap, and that more in depth policy is thus necessary to completely close it.

AHS-O2-1. Out of Anger and Deception: A Feminist Rhetorical Criticism of Toxic Relationships in Steven Universe

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ABSTRACT
Although American children's animated series, Steven Universe, is often praised for its diverse and queer representation, people often overlook that the show also portrays toxic relationships. This portrayal moves the narrative along and frames the characters as learning and growing from their traumas. In this study, I have evaluated the portrayal of the toxic and abusive relationship of Lapis Lazuli (Lapis) and Jasper in Steven Universe using feminist rhetorical criticism. Informed by rhetorical theories of gender, hierarchies, and power dynamics, my analysis shows there is an issue of consent displayed between the characters, as well as blatant physical and verbal abuse. Additionally, other characters' comments about the relationship provide explicit acknowledgment that the relationship is harmful and abusive. Power dynamics are also apparent in the simultaneous framing of a relationship between two females and the distinctive presentation of Lapis as feminine and Jasper as masculine, which mirrors but also complicates gender roles. The results indicate that the depiction of abuse through Lapis and Jasper is nuanced and accurate, enabling Steven Universe audiences, likely children and young adults, to recognize toxic relationships that are often missing from children's media. As children are the primary audience of this show, it is implicated that Lapis and Jasper's portrayal acts as a lesson for younger generations, introducing them to toxic relationships early on as a way of educating them on what to identify as unhealthy and presenting them in a way that challenges traditional gender roles and power dynamics between men and women.

AHS-O2-2. Social and Emotional Content in High Quality Neurodiverse Picture Books

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ABSTRACT
Social and emotional competencies are important to support a lifelong development of positive regulatory behaviors, strong relationships, and responsible self-awareness. An ideal starting point for educating early cognitive, behavioral, and affective development is through read-aloud picture book experiences which are well-practiced activities in early childhood as parents often model positive interactions with books to instill confidence in rising readers. Using a qualitative content analysis approach, a data set of Own Voice and Own Voice Adjacent picture books from differently abled writers, nominated and award-winning titles from the Schneider and Dolly Gray literature lists, and contemporary releases or read-alike titles were examined for high quality social and emotional content in both the text and illustrations. From the initial selection of 48 books, only 34 were analyzed for SEL competencies due to lack of depth as a picture book or poor depiction of disability. To promote trustworthiness in the analysis of picture books, the researchers used constant comparative analysis for inter-rater reliability of titles based on holistic reading experience criteria: presence of SEL competencies, synergy between the images and words, and humanistic disability representation. The inter-rater agreement percentage per category was 77% for exemplary, 57% for fair, and 75% for underdeveloped titles. Findings from this study show that the most prevalent competency was self-awareness (91%) and relationship skills (90%) while the least present competency was responsible decision-making (65%). Researchers identified 10 exceptional titles, which strongly incorporated one of the five SEL competencies, as noteworthy teaching material for educational professionals.

AHS-O2-3. Fostering an Inclusive Recovery

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ABSTRACT
The COVID-19 pandemic impacted the economies across the United States, but few areas were hit with the same severity as southern Nevada—which reported a nearly 30% unemployment rate in April of 2020 . This presentation will review the methodologies, plans, and goals of the study. Through interviews with businesses, community leaders, and workers, this study seeks to determine how groups of southern Nevadans were impacted, and whether they experienced a disparate economic recovery since the onset of the pandemic. The first group of interviews will be 'individuals in leadership roles' from higher education institutions, elected officials, business bureaus and organizations, unions, healthcare practitioners, and leaders of community organizations (including for housing assistance, food assistance, and Native American Tribes). The second group, the 'non-leaders' will consist of service workers, students, single-parent households, etc. By garnering a holistic view of the impact of COVID-19 on southern Nevada, we will gain a thorough understanding of what policy mechanisms can prevent and/or mitigate the impacts of future recessions in southern Nevada.

AHS-P1-1. Beer Consumption in the United Kingdom

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ABSTRACT
It is said that alcohol is an important part of British culture and tradition. Britons seem to drink regardless of the time of day and/or the company they are with. We looked into the most popular beer categories in the United Kingdom to determine why some beers are far more popular than others. Our research suggests that there are various factors that play into WHY a particular beer is chosen for consumption.
We collected data from interviews conducted by The Society of Independent Brewers (SIBA) to distinguish what their favorite type of beer is, why they choose to consume that beer, where their favorite location to consume beer is, and the relationship between price and quality. We used various methods of data collection such as graphs and interviews that were taken through the British Beer Pub Association. The analytics provided us with an understanding as to why certain beers are favored and how that impacts the drinking culture in the United Kingdom.
We are continuing to collect data in order to come to a conclusion.
Our research contributes to the understanding of the beer industry and different markets in not only the United Kingdom, but also all over the world. The implications of this research suggests a growing trend in consumer individuality and consciousness and the role of established culture and tradition when choosing beer for consumption. We believe firms, supplied with this knowledge, can use this to predict trends and market their product more effectively and efficiently.

AHS-P1-2. COVID-19 Key Figures in the Philippines

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ABSTRACT
COVID-19, a two-year ongoing pandemic, has severely impacted everybody in this entire world. In January of 2020, the Philippines recorded its first confirmed case of COVID-19. Just like the United States, the Philippine government decided to put the country on lockdown in order to control the spread of COVID-19 infections throughout the population. Not only did this impact many individuals' lives, but it also had a huge effect on the economy of the Philippines. As of the month of October 2021, it has been estimated that 2.7 million Filipinos have been tested positive for COVID-19. Once COVID-19 started spreading throughout the world, tourism, which has a huge economic impact on the Philippines, has decreased by as much as 7.4%. In the year of 2020, which is the year most of the lockdowns occurred, the Philippines' real gross domestic product fell by approximately 9.5% in comparison to 2019. Luckily, the vaccine has been made available to the Philippines beginning March 2021, and as much as 22 million people have received at least the first dose of the vaccine. Because of the vaccines, it is projected that the Philippines GDP will be going up by 6.89% by the end of this year.

AHS-P1-3. The Spanish Culture and Eating Out

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ABSTRACT
Cultures apart from the American offer important and various perspectives on how other cultures value time and social events. In the year of 2019, there was a substantial rate of out-of-home consumption of food. The most frequented locations were establishments that offered a more social environment, such as restaurants and cafes. Our purpose is to break down the reasoning behind the outside food consumption in social places rather than the opposing scenario of hosting social events in the household, leading to at-home consumption of food. We want to ask the question of what are the cultural influences that lead Spaniards to opt for dining out for social occasions rather than in? In addition to this question, do the seasons affect this relationship? By reviewing Spanish articles and works, we are able to gain insight into their culture and their relationship with socialization and food consumption. In addition, our methodology of research will be through analyzing trends in a descriptive assessment with graphs, charts, etc. The significance of culture and its role in small decisions such as eating out or staying in, have yet to be explored. We offer a potential explanation for the phenomenon.

AHS-P1-4. China's Video Game Market

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ABSTRACT
About 720 million people in China play video games. Of those people, 110 million are under the age of 18. With China's new regulation on gaming limiting children under 18 to 3 hours a week of gaming, will this affect the longevity of video game sales? Data analyzed by passports country analysis in 2021 sales are expected to reach 306 million CNY and is expected to grow by 30million CNY in 2022. The leading factor to the growth is Covid-19. As China's Society returns to normal after the pandemic and having these regulations on children under 18, it is expected that the revenue growth should be lower than the expected growth in 2022. Looking beyond 2022 if this limitation is still apparent then the new generation will most likely not be exposed to video games as much as they are now which would affect the video game markets in China. In the future, most Chinese video games will not be catered to children because the target market dwindles with the regulations. In conclusion, China is run through a strict government and may implement more limitations to further impact video game sales. The Chinese government owns the majority of all sales of the video game market in China and may further implement regulations that avoid targeting children with video games. The longevity of Video games and sales may be in fact on a steady decline in the upcoming years.

AHS-P1-5. Motor Vehicle Sales in China

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ABSTRACT
With the advancement of electronic and new energy vehicles, motor vehicles are becoming more obsolete as the years progress. China is currently the leading producer and sales of vehicles in the world. Motor and combustion engine vehicles populate a lot of chemicals into the atmosphere compared to those of new energy vehicles. The study will investigate the sales of motor engine vehicles in China and the possible factors that can be influencing the sales. This research will look into factors like the unemployment rate and the development of new energy vehicles.

AHS-P1-6. Japanese Recreational Swimming Rate

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ABSTRACT
Looking at recreational swimming trends based on age tells us a lot about the priorities that Japanese people have as they grow older. In addition, the amount of recreational swimming has changed a lot in the past 30 years. The numbers for swimming drop significantly as people get older in Japan, as well as have dropped by over 50% in the past 30 years for most age ranges. Looking at various data sets from surveys conducted by the Ministry of Internal Affairs in 2016, we see that the amount of swimming drops dramatically after age 14, and the amount of swimming has also been decreasing since 1986 for some age groups, and increasing for others. For each age range, this drop shows Japanese school and work culture, where there is little time for recreational swimming. Most middle schools have their own pool where kids can swim. However, in high schools clubs and extra classes take significant time from students. At work, people stay for long hours, and rarely have time to go to public pools.
Since 1986, the amount of swimming has decreased a lot for most age ranges because there are other activities available such as indoor activities due to better air conditioning. There is an exception to this though. The amount of recreational swimming for people over 60 has slightly increased because the older population is becoming more health conscious. This data represents the Japanese lifestyle, and gives an insight of the culture surrounding recreational activities in Japan.

AHS-P1-7. Most Impactful Years of the Yemeni Civil War

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Jacob Gross[2]
Noah Myers[3]
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ABSTRACT
The Yemeni civil war that started in 2014 has ravaged the country and has led to a surge of negative changes in living conditions throughout the area. Many different events throughout the seven-year war have led to harsh conditions to still be prevalent throughout the country. It is hard to pinpoint what years of the war had the most effect on the society's well-being. Using data from the Yemen Data Project, it was possible to find what years of the war were the most violent, and compare that data to the GDP of Yemeni people, the number of undernourished people in Yemen and the average dollar amount of aid the Yemeni people require per year. Results showed that despite the beginning years of the war being the most violent as the most airstrikes were being dropped, the conditions of Yemeni people continue to get exponentially worse despite a heavy drop in the amount of airstrike attacks against them. Lack of military clashes has not led to better conditions that deteriorate day by day. The vast intensity of the first few years of the war were so devastating that they created a ripple effect in which the infrastructure of the country was heavily damaged, leading to a situation that will need much assistance to repeal the effects of the most impactful years of the war.

AHS-P1-8. Geography Illiteracy in America?

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ABSTRACT
By now most people have heard or watched the Jimmy Kimmel skit where he asks multiple Americans to point out a random county only to fail completely, as far as completely forgetting where The United States is on a map. Since the early 1980s US geographic illiteracy has been a topic of discussion, with some calling it a national security threat. This research will address if Americans are geographic illiterate, and whether geography should be taught more in the school systems in an age of globalization. This research sets out to contribute statistical data on how many University of Nevada, Las Vegas (UNLV) students can guess correct locations compared to every day people asked randomly on the Las Vegas Strip. The methodology I took for this research consisted of randomly asking 100 students at UNLV to identify The United States, an eastern state, and Afghanistan on a map. The same experiment was repeated on the Las Vegas Strip. The experiment at UNLV would test if university students score relatively better than average people asked, and the experiment at the Strip would represent the average American many Americans around the US visit the Las Vegas Strip. The results from this research show that almost all Americans can locate The United States, around half can locate an eastern state, but most could not identify Afghanistan. University students do average better results than people on the Strip as hypothesized. This research shows that most Americans aren't as.

AHS-P2-1. Why is Ethiopia at War with Tigray

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ABSTRACT
EPRDF (Ethiopian People's Revolutionary Democratic Front) took control of the government in 1991, EPRDF consists of TPLF (Tigray People's Liberation Front), ADP (Amhara Democratic Party), ODP (Oromo Democratic Party) and SEPDM (southern Ethiopian's People's Democratic Movement). From the minority group of TPLF, Meles Zenawi become prime minister of Ethiopia from 1991 till his death 2012. Because of the prime minister ethnicity, TPLF become powerful and influential ethnic group in Ethiopia. All top government position in Finance, military, intelligence filled by Tigrayan. During his time all Tigrayans get special treatment in almost all aspect of the government from off record incentive such as access to the government service, tax breaks and soft regulatory oversight for those from Tigray ethnic group. This paper will investigate and analyze factors that leads Ethiopia to have a war with Tigray. My research uses comparative research method and use key interview in gathering relevant data. The finding of my research demonstrates that in 2018 Current prime minister Abiy Ahmed come to power and change Ethiopian democracy by releasing political prisoners, allowing political expatriate to come home, and lifting bans on press. This reform resulted TPLF to lose their power and leads to corruption investigation against TPLF. In response to that TPLF attacked the Ethiopian military base, soon after Ethiopia military start defending the country with the support of neighbor state like Amhara, Oromo. It is very important to discuss the underlying reasons for this war and the link of this war with economic and political power.

AHS-P2-2. Population Changes in the Syrian Arab Republic: 2010-2020

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ABSTRACT
This paper intended to study the population-related effects of the Syrian Civil War on the Syrian Arab Republic. The Syrian Civil War that started in March of 2011 is still on-going, along with the associated refugee crisis that arose from it. To determine the extent of the continued crisis, we decided to utilize population data to make inferences related to population growth, decay, and stagnation from the year 2010, through 2020. We found that during the initial stages of the Syrian Civil War, there were significant levels of population decay. However, by as early as 2015, the population decay had slowly begun to lessen, and by 2019, a marginal level of population growth had begun. By 2020, the population growth was nearing pre-war levels, and the level of population growth now makes the Syrian Arab Republic one of the fastest-growing countries worldwide. These findings should allow for a better understanding of the current situation within the Syrian Arab Republic. Particularly, this paper should assist humanitarian groups in understanding where to focus their resources. Additionally, this paper should provide government officials the data necessary to re-shape their policies towards refugee assistance and foreign aid.

AHS-P2-3. What Determines Musical Preference?

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ABSTRACT
Music is a universal interest in every human culture. It is evident that music plays a substantial role in the lives of people all over the world because it produces diversity among preferences, and it exhibits links to individuals' personality traits. After conducting our research, we aim to determine which factors influence an individual's choice in music. A problem we would like to address in our research is the preconceived notions individuals have based on a person's music taste. Our objective is to determine how personality and age influence musical predilections among different regions of the world. The methods we plan to utilize to conduct our research is to evaluate case studies, assess surveys, and conduct observational trials. The goal we want to achieve after research is conducted is to learn what gravitates individuals to pick certain music preferences. Some qualitative and quantitative data factors that indicate the results of the project are the diversity in personality types and age ranges. Our research is still in the works, but we anticipate our findings to give us more insight on what factors matter to individuals that lead them to pick a certain music style. This study is unique because it shows how diverse preferences in music are in different regions of the world and if those musical tastes are influenced by different factors depending on the region. Some broad implications we will discuss include common misconceptions of personality based on specific musical likings and why individuals prefer certain types of music.

AHS-P2-4. Daum Kakao Gaming Sales 2015-2020

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ABSTRACT
The video game industry is large with many companies having their hands in it. Very notable companies include Sony, Microsoft, Nintendo, and the famous South Korean based company Daum Kakao. In quarter four of 2020 the company made 140.8 billion won just off of its video game branch Daum Kakao Games. 140.8 billion won can be compared to about 119 million USD and that is in a singular quarter. My objective is to analyze why Daum Kakaos Games are so profitable. How gaming companies make a profit depends on what game model they use. Some companies just have the consumer buy the game for a flat amount, some release free games that have microtransactions built in. Daum Kakao has games such as Black Desert Online, PlayerUnknown's Battlegrounds, Path of Exile, and Eternal Return that they publish. I took a look at these games to see what sort of process they used to have players spend their money on the game and discussed with players of the game why they spend money. After looking into these games and talking with players I found they gain a large amount of their revenue from microtransactions made in game to get special cosmetics for your characters. These games are so profitable and successful in a market because they provide players with a way to customize and express themselves in an appealing way. It also allows them to show off to peers with what exclusive in game items they have obtained.

AHS-P2-5. Impact of COVID-19 on Tourism in Spain

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ABSTRACT
The objective of this analysis was to quantify the effects of the COVID-19 pandemic on the tourism industry in Spain by looking at Airbnb revenues and bookings, and to learn whether the Airbnb data could indicate if the industry was recovering. Airbnb has grown exponentially in popularity since the onset of COVID-19, and looking at Airbnb revenue and bookings may be more indicative of a country's tourism industry than looking at traditional hotels. Two open source datasets taken from Statista were used in this analysis: Airbnb revenue in Spain from 2015 & 2019 and COVID-19 impact on Airbnb bookings in the GB, France, Spain and Italy 2020-2021. The second dataset was filtered to show only the Spain data. From the first dataset, it can be seen that Airbnb revenue had a 181% increase in the span of four years. From the second dataset, it can be seen that when the first case in Spain was reported on January 31st of 2020, Airbnb bookings had experienced a sharp decline from the previous week, of 15%. After reaching an all time low during the week of March 30th, 2020, with a decline of 97% in bookings, there had been a steady increase until mid July of 2020. While the data is not steadily increasing, the overall trend does show that Airbnb bookings are increasing, though they are still about 20% less than the pre-COVID bookings of 2020. This data corroborates with the increase in tourism to Spain, which is 78% compared to 2020.

AHS-P2-6. The Relationship of Growing Deforestation Rates in the Brazilian Amazon and Various Factors

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ABSTRACT
In Brazil, the Amazon rainforest covers a massive area. Spanning five million square kilometers, it is frequently referred to as the "lungs of our planet". In June of 2021, a report portrayed the deforestation area in the Brazilian Amazon from 2004 to 2020. The data provides an objective view of the growing problem of deforestation in the Amazon. This paper will uncover the factors related to the increasing rate of deforestation. To uncover these factors, our research will determine which years held the biggest year-over-year rate increases, and we will then research changing economical, cultural, and political factors that could contribute to increases in the deforestation rate. In referencing the deforestation rates, it was determined that in 2016 and in 2019 there were major increases to deforestation. It was found that, in 2016, there were increased demands of crude oil in the US that drove increased deforestation. Additionally, in 2018, Jair Bolsonaro became the Brazilian president and rolled back environmental protection laws which lead to increased deforestation. In conclusion, 2020 saw Brazil report the largest area of primary forest loss. The implications of Amazon deforestation relate to climate change, endangered species, and conservation of ecosystems. Unfortunately the fate of the Amazon rainforest is tied to the overall state of political and economical mindsets in Brazil. In order for the fate of the Amazon to be rectified, a global effort should be made in order to enact laws to ensure the Amazon can remain the "lungs of our planet."

AHS-P2-7. The Market for Coffee in Finland

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ABSTRACT
Coffee is one of the most consumed beverages in the world. Finland ranked No.2 on the list of countries that are most addicted to coffee in 2020. The purpose of this research was to find out the impact of coffee consumption on imports, and the projection of the coffee market in Finland for the next decade. We examined data previously reported on various sources. By analyzing the changes in import frequency and share for each of Finland's main coffee suppliers from 2018 to 2020. This data will then be used to project the future impact on Finland's coffee importers for the next decade. The data collected on Finland's main coffee suppliers from 2018 to 2020 will be utilized in a simple linear regression analysis to forecast the relationship between the market for coffee in Finland and coffee imports into the country. While our results are still in process, the coffee market share is expected to grow in Finland. Coffee consumption has a positive impact on imports of the country.

AHS-P2-8. The Mexican Housing Market: An Analysis for Those Seeking to Buy Real Estate Property to Live in or Invest

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ABSTRACT
This research aims to investigate and better understand the Mexican Housing Market and provide information geared towards fundamental knowledge and or potential investment opportunities within the Mexican housing market. The focus is on the average housing price per Mexican State, the five highest, lowest, and the five leading travel destination states in Mexico. The median days on the market of the Mexican Housing Inventory and the increasing value of the residential market in Mexico were analyzed to give guidance for those interested in this market. Survey time period Data was collected, reviewed, and analyzed. Results show that the National Average price was $1,310,750.00 MXN ($64, 700.00 USD). The median days on the market have ranged from 22.5 days to 70 days since January 2021. The projected value of the residential real estate market for 2021 is $41.3 billion USD and is forecasted to continually grow in the coming years with a speculated $60 billion USD in 2025. The research shows that the Mexican housing market is growing and can be a competitive alternative for those looking to buy real estate property to live in or invest.

AHS-P3-1. Did You Eat Your Worms?!

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ABSTRACT
If Americans include insects as part of their diets, global pollution will decrease. Insects use less water to farm, produce 85% less methane than regular barn animals, and are packed with nutrition. As I analyzed the world population, I discovered that 80% of the world already eats bugs as part of their diets. It's especially popular in underdeveloped countries. Spreading the popularity to America will be difficult, as the most consumed meat is Chicken, Cows, and Pigs. These animals are mass produced and cause a huge impact on the environment. In conclusion, if we work together to bring insects in American meals, we can decrease global warming and create a sustainable environment.

AHS-P3-2. Unsustainable Fast Fashion in the United States

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ABSTRACT
My research will be focused on how unsustainable fast fashion is killing the ecosystem, whether or not it is bad for the environment and what percentage of it ends up in landfills? Boohoo, Shein and PrettyLittleThing are popular fast fashion retail apps among U.S consumers, cheap fast fashion tends to encourage consumers to over buy. My research will start with where does fast fashion come from and where does it end up? Fast fashion is based on trends going on in the red carpet, fashion shows or influenced by social media. Throwing away clothes because it is out of style should never be an option. Once people are done with a piece of clothing, they can give away their items, donate to thrift stores, or even resell their items. My research will explore ways on what consumers can do to decrease the percentage of fast fashion that ends up in landfills. The top 10 worst fabrics for the environment include cotton, polyester, nylon, acrylic, viscose, bamboo, acetate, and wool. These fabrics are considered bad for the environment because they do not completely break down and some micro plastics can make their way into the ocean and soil. One way to stop putting the blame on consumers is for brands to become more aware about how what they are doing and making is affecting the environment.

AHS-P3-3. Mexico Natural Disasters

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ABSTRACT
For centuries Mexico has faced numerous natural disasters that have taken a toll on the country's economy, human capital, and left the country in a state of uncertainty. When most people think back to some of the most devastating tragedies in Mexico, they may reflect on those such as Hurricane Wilma or the 1985 Earthquake. However, the Covid-19 pandemic may quickly surpass previous natural disasters and continue to contribute to the financial hardships in Mexico. Both qualitative and quantitative data show that Covid-19 has cost the country millions of dollars in healthcare, unemployment, and other additional expenses, leaving the country in a state of financial instability. As Covid started to become the global epidemic it is today, the unemployment rate in Mexico began to increase, increasing over one percent from May to June 2020. As of January 18, 2021, the cost of the pandemic has already reached 924 million dollars, nearly reaching the cost of the 1985 earthquake. The average cost to treat Covid in Mexico is $20,000, more than many people make in a year in Mexico. At-home treatment also costs around $3,000. Families have been financially ruined trying to fight for their loved ones' lives. If continuing at this rate the Covid-19 pandemic will surpass the 1985 Earthquake and Hurricane Gilbert in cost. This intense financial burden on the country and its citizens can leave the country heavily damaged in the short and long term future.

AHS-P3-4. Portugal's Home Ownership Rates with Covid-19

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ABSTRACT
Home ownership is a necessity to all people and with the recent global economic implications of Covid-19 this has become more difficult. This study will aim to explore the associations between the negative economical implications of Covid-19 and home ownership rates in Portugal. I analyzed home ownership rates in Portugal and economic statistics of Portugal including, unemployment rate, GDP, and core inflation from 2018-2020. Historical statistical information from Portugal was collected and observed to find patterns or correlations between Portugal's home ownership rate and their economy following the Covid-19 pandemic. Portugal saw its' home ownership rate drop by nearly a percent (0.8) from 2018-2020. Portugal's GDP, which accounts for 0.2% of the world's GDP dropped by over $10 Billion dollars from 2018-2020, while the country had an inflation rate of 1.5% in 2020, the highest in three years prior. Unemployment rates peaked at 8% in 2020. During the Covid-19 pandemic Portugal's economy was impacted negatively and its' home ownership rate followed suit. Portugal will need to look at lowering unemployment rates first to kickstart their economy into the post-pandemic era and ultimately bring home ownership rates up.

AHS-P3-5. The Challenges Navigated by Frontline Workers During Covid-19

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ABSTRACT
During the coronavirus global pandemic, the frontlines have navigated challenges of unprecedented market, social, and cultural disruptions. The objective of the study was to investigate different challenges experienced by the frontline workers during the early stages of the outbreak and what are the transformative changes in their jobs that they had to undergo from the first wave of the pandemic to the present. Here I conducted qualitative research among three frontline workers representing human services, education, and hospitality industries. They participated in semi-structured interviews by telephone. Interviews were audiotaped, transcribed, and analyzed manually. Six theme categories emerged from data analysis. Participants experienced physical, psychological, and financial distress, health concerns, social exclusion, and job insecurity. The most common challenge for all was the safety of their health and financial distress. Consequently, each of their jobs has transformed dramatically and employee morale has decreased for a lot of employees while others have realized the value of their job. The study found that frontline workers' resilience and the spirit of professional dedication despite being drained physically, emotionally, and financially during the covid-19 outbreak. This suggests the need to understand and target involvement for the specific risks and challenges faced by different groups of frontline workers in order to have a better contingency plan for future events of this nature. Strategies should be implemented to support and to meet the unmet needs such as physical and mental health, reasonable pay, job security, and the overall quality of life of the frontline workers.

AHS-P3-6. LGBTQ Community in Korea

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ABSTRACT
This research study pertains to the conservative views in Korea based on people's sexuality (LGBTQ). The goal is to understand Korea's history, political influence, and cultural background on why their views differ from the rest of the world in terms of discrimination against the LGBTQ community.
I analyzed the history of LGBTQ in Korea, including the Seoul Queer Parade. I also analyzed Korean politics that have a huge effect on people's opinions and cultural views. Additionally, I looked for the reasoning behind their social and cultural views on why they have homophobia and why they feel the need to result in violence, inappropriate or rude commentary, and sexual harassment.
Statistically, we can see that out of 8,336 people in South Korea who have taken the survey, 57% are still opposed to the LGBTQ community. It has gradually decreased over the years since 2013 by around 5%. Lesbians feel the need to balance their safety and visibility as they are targeted by Anti-LGBTQ activists. There are contemporary social movements in South Korea that exist to prove that same-sex marriages are formed due to the same type of love that heterosexual people have.
I conclude that the LGBTQ community within Korea is generally in danger, hence why most LGBTQ identified people choose to hide their sexuality. The conservative views in Korea are still causing homosexuality to be seen as abnormal. However, Korea is slowly accepting the LGBTQ community overtime thanks to the international influence that proves that the community exists.

AHS-P3-7. China's Important 2060 Carbon Neutrality Goal

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ABSTRACT
Climate Change is a serious threat to global security and well-being. Many developed nations and some developing nations have made promises to become carbon-neutral (net zero emissions), or carbon-free by a specified timeframe. China is a developing nation with high growth and has set a goal to be carbon-neutral by 2060. This study aims to determine how much China would need to reduce CO2 emissions to achieve this goal, and how it compares to other nations, using the most current data, and mathematical analysis. China produces the most CO2 in the world, almost twice as much as the United States, and accounts for 28 percent of world CO2 emissions. China would have to eliminate almost 500 million tons of CO2 emissions year over year to meet the 2060 goal. This represents an enormous challenge, especially considering China's CO2 emissions are still growing, but will be crucial to ensuring keeping total global temperature rise to 1.5-2 Celsius.

AHS-P3-8. Waste in China

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ABSTRACT
With a world full of inescapable garbage, how much is the emerging country of China producing and should the globe be concerned? As the most populous country in the world, China accounted for over 15% of the earth's waste volume in 2020. China has the biggest share of waste in the world, but is it enough for other countries to intervene?
Higher levels of greenhouse gas in the earth's atmosphere change its climate and some of these gases are linked to solid waste. These changes can result in more frequent, dangerous natural disasters (floods, hurricanes, mass species extinction, disease, etc.) and could damage communities all over.

AHS-P4-1. Italian Mafia and the Impacts it has on Society Today

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ABSTRACT
Cosa Nostra, or the Italian Mafia, the roots of the American mob and that way of life lead to the inspiration to the Godfather and so many movies. This Digital research poster dives into the state of affairs of the Cosa Nostra in Italy. How many organizations there are, were, and will be. It also studies the immense effect the mafia has on crime in Italy from homicides to corruption. This poster looks into five different data sets over the years focusing on the relationship between what type of crime is being committed to the potency of the mob at that time. Although the amount of crime and the number of families have gone down significantly since the ’80s. The mafia in Italy is still alive and well compared to its counterpart in the states, with, crimes such as homicides, murder, extortion, gambling, and so on.

AHS-P4-2. Singapore Waste Management

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ABSTRACT
With the constant population growth in such a limited land, Singapore is faced with multiple challenges in waste management. Over the last decades, Singapore aimed to strive for a zero-waste environment for its nation by reducing the significant amount of waste disposed of through recycling and maximizing landfills. The scope of this poster is to present whether Singapore has had an efficient control over its waste management in the last two decades. The poster took approaches to analyze statistics that concludes the recycle rates categorized into different classifications of waste disposals from 2003 to 2020 and average of total saved energy through the process of recycling. Overall, the findings suggest Singapore had an efficient waste management at the beginning with constant growth of recycle rate, but discrepancies are found starting from 2018 since the rate declined rapidly in three years. So coming to the conclusion that Singapore's efficiency on waste management control still has the potential to develop sustainable improvement. Visualizing these data can help Singapore's government to implement recycling policies that motivate people to improve their living environment.

AHS-P4-3. Most Popular Fast Food Places in Germany 2015-2019

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ABSTRACT

The top three fast-food restaurants in Germany are McDonald's, Burger King, and Nordsee. Even though Mcdonald's is by far the most popular, they have had a dramatic decrease in revenue and net income when compared to other fast-food brands since 2012. Based on the research we have conducted, we can explain why McDonald's is beginning to fail in one of its largest European markets. We learned that the main reasons for McDonald's Germany's decrease in revenue are consumers' changing preference in fast food dining and the increase in healthier alternatives from local competitors. What is unique about this situation is that despite Mcdonald's having control of most of the German market and a vast amount of resources and knowledge of operating in foreign countries, they continue to perform poorly when compared to their much smaller competitors. However, as dire as the situation is becoming, we believe that Mcdonald's can turn its operation around by changing its business model and strategy to better accommodate the market and consumers.

AHS-P4-4. How The Pandemic Has Affected Christmas in the UK

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ABSTRACT
Christmas is the day in which many religious people commemorate the birth of Jesus Christ. Traditionally speaking, many celebrate Christmas by giving gifts and spending time with their loved ones. On average, British consumers spend at least 500 pounds on Christmas presents. But during 2020, companies felt the financial impact of the pandemic, where most consumers spent only 400 pounds, some regions even as low as 300 pounds. In a survey conducted, approximately 39 percent of respondents felt worried about their financial situation during Christmas. These findings suggest that while Christmas is a joyful season, it can also be a time of financial stress, and the pandemic only hardened the decisions that consumers had to make. We will compare 2019 sales to 2020 sales to analyze how the pandemic has affected not only companies profits but consumers spending habits as well.

AHS-P4-5. Picking the World's Next Best Wine – The Descriptive Determinants of Excellent Wine

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ABSTRACT
Fourteen times per year roughly one million consumers flock to read the newest issue of Wine Mag (one of the most widely regarded wine magazines in the world) to discover the highest rated wines in the ever-growing $417.8 billion industry. What are the characteristics that could potentially predict the next highest rated bottle of wine?
Over 3.8 million Qualitative data points from Wine Mag were used to analyze what the typical qualities of excellent wine are. An analysis of the wine's country, province, variety, price, and manufacturing winery were analyzed in this study.
Per the analysis, an excellent bottle of wine (95 – 100 points out of 100) is most likely to have the following characteristics: it's from the United States, specifically California, its median cost is $110.50, it's blend is a Pinot Noir, and Williams Selyem is the winery that produced it.
The implications of this research is multifaceted in that it could be used to educate investors in the wine industry on where to focus investments in geographically, or to simply help consumers choose a wine that is likely to be highly rated without having to do extensive research.

AHS-P4-6. Second Ground Zero: The Impact of the Early Stages of COVID-19 on Italy, and its Future Mitigation

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ABSTRACT
When COVID-19 was first discovered, the extent of its possible impact was still unknown. Unfortunately, Italy was one of the first major countries to suffer from the effects of COVID-19. At the time, there was no accessible testing, standard protocol, or vaccines. Upon easing initial restrictions, Italy was faced with a second wave. However, once protocols were re-introduced, the spread was mitigated again. Italy is a visual case in understanding the extent of the impact COVID-19 can have, as well as providing an understanding of the importance of accessible testing, standard protocol, and vaccines as it relates to the mitigation of the effects of COVID-19. By viewing Italy's COVID-19 case statistics, it can be concluded that it is possible to mitigate the spread of COVID-19 and control its effects on major countries.

AHS-P4-7. Concerts vs. Festivals in the UK

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ABSTRACT
Music is a phenomenon that brings the world together. Listeners set their differences aside and connect through the world of music. The United Kingdom has played an immense role in the growth and development of music and live performances. The first concert was held in London in 1672, and the first festival was held in 1968. This was the beginning of the launch of live music in the United Kingdom and all around the world. It is hard to decipher if concerts or festivals are more popular by attendance because concerts are held by artists year-round, while festivals are more seasonal. However, the growth of attendance can provide information on which form of live music is growing at the fastest rate in the United Kingdom. The data studied shows that both concert and festival attendance increased greatly from 2012 to 2019. In 2020, the Coronavirus pandemic put a halt on concerts and festivals, resulting in an 85% revenue loss for the live music industry. In June 2021, the first live music event after the pandemic was the Download Festival in England, allowing 10,000 attendees. This was a tenth of what was allowed prior to the pandemic. The live music industry is still recovering from the loss caused by the pandemic, however, now that more live music events are occurring again, people will have a desire to experience what life felt like before the pandemic. It will take time to reestablish the industry, but from the data gathered before the pandemic, concert and festival attendance is going to continue to grow.

AHS-P4-8. The Uniqueness of Japan's Love for Vending Machines

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ABSTRACT
Japan is widely known for their advancement in technology. One main use of technology in Japan is the frequent use of vending machines. They have a vending machine for just about anything, from the normal food and beverage to cigarettes and alcohol. In this research, there will be a further analysis of the many types of vending machines that are available in Japan. Specifically focusing on the vending machines that sell beyond the normal food and beverage. The main point will be to provide further detailed data for the uniqueness of usage of vending machines in Japan.

AHS-P5-1. Entrepreneurship and the Fight Against Poverty in the Philippines

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Flavia Nava[2]
Khashi Khorrami[1]
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ABSTRACT
Poverty is a global phenomenon characterized by people who live on US$1.25 daily. The universal call to action to end poverty is the foundation of the development agenda both nationally and globally. In accordance with the worldwide commitment toward the Sustainable Development Goals, the Philippine government has established the Philippine Development Plan that aims to build a stronger foundation for inclusive growth and by improving trade policies to stimulate a globally competitive knowledge economy. The Philippine government has to consider the critical dynamics in poverty in public policy and as well as expand the limitations of its assessments. Since the measurement of poverty can only be determined ex post, public interventions are only directed at those who are identified as poor. The vulnerability to poverty pertains to the risk to future poverty, thus trapping them in a cycle that diminishes capital from one generation to another. This study involves previous research that include estimates of vulnerability level of households to income poverty sourced from the Family Income and Expenditure Survey, as well as the Philippines' official poverty lines. Several interventions have been established to alleviate poverty, such as the conditional money transfer, foreign aid, and as well as entrepreneurship. That so, results have indicated that entrepreneurship is effective in increasing the probability of alleviating poverty, thereby remaining above the impoverished threshold. The study makes a case on the Philippine government's implication on creating income stabilization schemes to address poverty, and to come up with differentiated proposals for those highly vulnerable.

AHS-P5-2. Working Long Hours in Indonesia Does Not Result in Economic Progress

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ABSTRACT
The average Indonesian labor workers earn lower in terms of the hourly rate, thus forcing them to work longer hours to cover their daily financial needs, but how is this correlating to the country's economic progress as a whole?
Data are collected from the year 2017 by comparing Indonesia's Annual working hours vs. GDP per capita chart as well as the Annual working hours vs. Labor productivity chart to other countries. Richer countries tend to have fewer working hours but higher wage rates as well as higher productivity. The annual working hours per worker in Indonesia is 2,024 hours while their GDP per Capita was at $10,594.07 in comparison to Japan, a richer country in ASIA with annual working hours per worker of 1,738 hours while their GDP per Capita was at $40,373.75 which is 4 times higher in terms of GDP.
The economic progress of a country does not solely depend on long working hours, it does have a lot to do with resources and the ability to increase their life quality but workers in poorer countries barely have time to improve themselves in terms of skills, knowledge, or just in terms of their general health both mentally and physically. Workers who already worked long hours barely have time to invest in themselves, thus placing them in a loophole."

AHS-P5-3. Costa Rica's Quest for Global Renewable Energy

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ABSTRACT
Global leaders understand that Earth cannot survive if we continue to use fossil fuels for energy use, yet renewables make up of just 26.2 percent of global electricity generation as of 2018. The United States and Europe have made contributions to global renewable energy use but haven't made the leap that Latin American countries are willing to take. Primarily in Costa Rica, according to the country's National Center for Energy Control, Costa Rica has been running on more than 98 percent renewable energy since 2014. Most of this energy, 67.5 percent, comes from hydropower. Additionally, wind power generates 17 percent, geothermal sources make up 13.5 percent and biomass and solar panels comprise 0.84 percent. Results show that Costa Rica has proven that their country can run solely on renewable energy for up to 300 days, as they proved this in 2017 where they set a world record. Due to Costa Rica's plan to fully ban fossil fuels, deforestation has been successfully revered in the nation. Because of this, Costa Rica capitalized economically by enacting the Costa Rican Electricity Institute (ICE) and began selling its energy surplus to Central America's Regional Electricity Market in 2015. The electricity helps power Guatemala, Nicaragua, Panama, Honduras, and El Salvador. By 2019, Costa Rica has earned more than $180 million in sales of surplus energy. We conclude that Costa Rica is leading the forefront in green energy while maximizing their profits to sell to poorer countries to solidify their status as a Latin American powerhouse.

AHS-P5-4. A Comparison of Eating Behaviors

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ABSTRACT
How do eating behaviors differ in Japan, in comparison to the United States? How is it deemed healthier? Eating behaviors and diet has become an important factor due to the increasing statistics of obesity in America. Japan, known for its unique style of eating, and has shown the cultural basis of its standpoint on food, which has diverted its culture away from the adverse health effects that the U.S is known for. With the focus on the comparison of the U.S larger portion size to traditional Japanese meal size, there is an overall large effect on health and wellness. The Japanese traditional diet of washoku emphasizes the use of seasonal ingredients. It characterizes the importance of the food dishes being in harmony with nature and the nutritional needs of the human body. The American diet is usually meat, eggs, and dairy with a high emphasis on sugar consumption. Washoku emphasizes the elements of Cultural differences, and how tradition is emphasized in Japanese meals. Our research will use the following datasets: Self-assessment of health of diet among U.S. shoppers in 2015, Distribution of diets followed by consumers in the United States in 2018 in 2019, Leading food-related habits in Japan as of 2020, Most popular food trends in Japan as of November 2020 and The Role of the Japanese Traditional Diet in Healthy and Sustainable Dietary Patterns around the World. These datasets will guide through examining primary differences on the basis of nutrition, portion size, and cultural differences.

AHS-P5-5. India: COVID-19

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ABSTRACT
India is the second-most populated country in the world. Its imports and exports reach far across the globe and influence many countries. Last year, India was struck by COVID-19 and suffered greatly in several of the country's leading international aspects. We believe that in order to grasp the impact of COVID-19 on a large population, we need to take a deeper look into India as one of the most densely populated nations in the world. Specifically, we want to research India's population fluctuations, trade patterns, financial resources, and societal effects on the people. Our research came from peer-reviewed sources, credible media sources, and direct publications from the Indian government. With our research, we understood the impacts of COVID-19 on India and how the most heavily populated nation in the world changed after the global pandemic. This research significantly impacts recovering nations as we describe how a nation in the top 10% in the world suffered and how permanent changes can be drawn from this research to develop a strategy that minimizes further damages from COVID-19.

AHS-P6-1. Examining the Factor Structure of the Trait Meta-Mood Scale While Accounting for Data Point Censoring

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ABSTRACT
Meta-mood experience refers to thoughts and feelings that serve to monitor, evaluate, and at times change mood. The Trait Meta-Mood Scale (TMMS) was designed to gauge meta-mood experience along three factors: Attention, Clarity, and Repair. Previous factor analyses have verified this three-factor structure. However, one study by Palmer and colleagues found strong support for a four-factor structure. In light of this discrepancy, the present study aimed to replicate Palmer and colleagues' study in a new sample, comparing the models they used and determining which is best-fitting. We also aimed to correct the effect of data point censoring when estimating factor models. Data censoring occurs when researchers only have partial information about the value of a variable. 202 college undergraduates completed the TMMS during an online study. To compare the models, we relied on Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC). Results revealed that the four-factor model fit the data better than the three- and one-factor models tested. The first three factors corresponded to the previous Attention, Clarity, and Repair factors. The fourth factor was named Emotional Resilience because the items loading on this factor suggested resistance to negative emotional experiences. We suggest TMMS users calculate scale scores based on all four of these factors to provide a more detailed description of meta-mood experience. Limitations of the present study include the lack of absolute fit measures for the models tested. Future researchers should use other statistical programs to replicate (or extend) our study.

AHS-P6-2. Moving beyond Trauma-Informed Approaches to Understanding Social Suffering In and Because of Schools

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ABSTRACT
Social suffering impacts students' who are from underprivileged backgrounds. The traumas associated with students who are experiencing struggles at home are very prevalent in society, but many educators aren't prepared to understand and address these students' issues. Due to this, it is commonplace that schools can potentially inflict additional traumas in their students' educational experience. Further research and proper implementation of trauma-informed practices can best assist both students and instructors, as well as the institutions that create these environments on how to address social suffering in and because of schools.

AHS-P6-3. Resilience in the BIPOC Community: A Systematic Review

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ABSTRACT
The present study is a systematic literature review on the psychology of resilience, or the ability to bounce back after a difficult situation. Although resilience is a timely and relevant variable in social psychology, little is known about its connection to the racism-related experiences of Black, Indigenous, and People of Color (BIPOC). This review explores how resilience manifests in the BIPOC community and its influence on the identity of minority groups. Previous research has shown that BIPOC reports higher resilience; however, there is still uncertainty around its connection to discrimination. Through the analysis of nine final research articles, we examined four main questions: (a) What is the prominent definition of resilience?, (b) How is resilience experienced or manifested among BIPOC?, (c) How is resilience operationalized when experiencing oppression?, and (d) What are the limitations in the literature of resilience? Results shed light on the need to further investigate resilience as a protective factor against discrimination in the BIPOC community.

AHS-P6-4. Morphology of Axon Initial Segments under Normal and Pathological Conditions

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ABSTRACT
The Axon Initial Segment (AIS) is a compartment within the neuron that plays a major role in the initiation of action potentials. Changes to AIS length and position can alter the probability of action potential firing. A majority of modeling studies consider the AIS to have linear morphology; however, we have observed different AIS shapes in different pathological conditions. The objective of this research is to classify AISs by shape (straight, curved, or kinked) and to determine the frequency of each shape across normal and pathological conditions. We stained AISs in cortical tissue using immunohistochemistry and imaged them with a confocal microscope. After imaging, we qualitatively categorized AISs in normal and pathological samples based on their shape and plotted them in ImageJ to obtain numerical data (Cartesian coordinates). We have compared AISs in cortical tissue from wild type mice to those from the Mecp2+/- model of Rett syndrome. We plan to use the Cartesian data to develop a model that describes the linear and non-linear morphologies of the AIS. Although previous research has demonstrated that position, composition, and length of AISs helps determine neuronal excitability, the relationship between AIS shape and pathology has not been examined. The current study helps establish AIS morphology as a possible pathological feature that may have functional consequences, and future experiments will investigate a relationship between AIS shape and neuronal excitability. Additional research may help to gain a deeper understanding of normal and pathological development and may lead to the development of new treatments.

AHS-P6-5. Frequency of Each Sex Affected by Sudden Unexplained Deaths due to Developmental Epilepsy

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ABSTRACT
Developmental epilepsy is a group of neurodevelopmental disorders that is mainly characterized by the onset of different types of seizures, developmental delays, and electroencephalogram (EEG) changes at a young age. Because it can describe a variety of syndromes, symptoms and specific causes may vary between affected individuals. Previous research has examined sex differences within affected adult populations but research examining sex differences for developmental epilepsy is lacking.
The objective of this research is to determine the frequency of each sex within a population of mice that died prematurely from developmental epilepsy due to mutations of the GABAA receptor α2 subunit.
To determine the frequency of each sex, we extracted DNA from the tails of pups that died prematurely. We determined their sex by running PCR to amplify the sex-determining region on the Y chromosome (SRY). PCR products were separated by agarose gel electrophoresis. Males are identified by the presence of two bands of 300 and 350 base pairs (bp) while females are identified by one single band of 350 bp.
Current research provides evidence that males are at higher risk for sudden unexplained death in epilepsy (SUDEP). The current study aims to examine whether males are at higher risk in our model of developmental epilepsy. Future research can provide additional insight into the mechanisms that lead to differences in SUDEP risk.

AHS-P6-6. Solitary Confinement and Criminogenic Attitudes: Is Isolation Reinforcing Pro-Criminal Thoughts, Feelings, and Beliefs?

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ABSTRACT
Documented increases of problematic symptomatology following exposure to social exclusion contexts may be suggestive of increases in antisocial cognition and pro-criminal attitudes among prisoners. An exacerbation in behavioral indicators of criminality in correctional populations including aggressive behavior, reduced cooperation, and deficits in impulse control may suggest that restrictive and exclusionary correctional practices can aggravate criminogenic thoughts, feelings, or beliefs. Existing literature indicates that an endorsement of pro-criminal attitudes is one of the greatest predictors of future criminal behavior.
The study will recruit 400 randomly selected female adult inmates from Florence McClure Women's Correctional Facility of Las Vegas, Nevada. A hard copy of self-report survey will be given to the participants and is expected to take 1 hour to complete. After informed consent, participants will be asked to complete a survey regarding their demographics, confinement, and pro-criminal attitudes. Participants will be surveyed at the beginning of the study, and approximately 1 week after they are released from segregation. At least one participant from the initial sample who approximately matches the demographics of the participant who is exiting segregation will also be surveyed at the same time as part of a control group.
The primary goal of this study is to demonstrate the negative effects of solitary confinement. The secondary goal is to impact policy in correctional institutions. This study aims to understand whether being placed in solitary confinement can affect pro-criminal attitudes. This research will become a strong premise to the argument of abolishing solitary confinement.

AHS-P6-7. The Effects of Altered GABAergic Signaling in Microglia on Hippocampal-cortical Network Activity and Remote Recall

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Ryan A. Wirt[1]
Amanda M. Leisgang[2]
Emmanuel Flores[1]
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ABSTRACT
Memory acquisition and encoding are modulated by neural network activity between the hippocampus (HPC) and prefrontal cortex (PFC). Research has shown that neuroimmune defense cells, glia, interact with neurons in both brain regions. However, little is known about glial-neuronal interactions, and how these interactions affect memory network activity and in turn, memory recall. Memory network activity involves a host of cellular excitation and inhibition. The primary neurotransmitter involved in inhibition is γ-aminobutyric acid (GABA), and receptors for this neurotransmitter can also be found on microglia. To better understand glial-neuronal interactions between the HPC and PFC, we utilized a mouse model (GABABFlox) with a knockdown of GABAB receptors on microglia, to alter microglial activity. Our lab utilizes electrophysiological recordings of neuronal activity related to learning and memory in the HPC and PFC. Mice were implanted with 64-channel implants to record from single cells and local field potentials (LFPs) while completing a conditioned place preference task to measure remote recall. Results showed that GABABFlox mice had remote recall (18days) deficits but intact recent recall (1day). We also found that GABABFlox mice had changes in multiple electrophysiological signals associated with memory processing, including: decreased gamma power in the HPC, impairments in theta-gamma comodulation in the cortex, theta and delta hypersynchrony between the HPC and cortex, and fewer sharp-wave ripples in the HPC. These findings suggest that GABAergic signaling on microglia may facilitate neural network systems involved in memory formation and recall, and that alterations in microglia may impair functions necessary for memory formation.

AHS-P7-1. Queering the Narrative: A Review of Interpersonal and Structural Vulnerabilities Faced by Transgender Americans

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ABSTRACT
Transgender and Gender Expansive (TGE) Americans face immense structural vulnerabilities, including difficulties in employment, legal protection, and equitable healthcare accessibility. TGE individuals also experience interpersonal violence through verbal or physical harassment, discrimination, hate crimes, and sexual assault.[1,2] Further, race and gender coalesce to create intersecting identities; for example, TGE women of color are the most at-risk group regarding socioeconomic status, immigration, incarceration and education.[3,4] The TGE population also suffers from a shorter life expectancy ($\bar{x}$=28.2 years)[5] compared to the average U.S. life expectancy (78.9 years).[6] Unfortunately, the lack of standardized data collection prevents comprehensive analyses of the effects of structural and interpersonal violence on the TGE community.[4] To catalyze a more thorough understanding of this topic, a literature review was conducted to analyze key themes surrounding TGE lives. Studies from the last 10 years were collected using the keywords "structural vulnerability," "interpersonal violence," and "transgender." Twenty-two sources were reviewed in which 7 referenced structural vulnerabilities, 6 interpersonal violence, and 9 both factors; all included transgender identities. Four representative case studies were then chosen to illustrate the thematic findings and prevalence of violence.[5] This literature suggests that structural vulnerabilities and violence put TGE individuals at disproportionate risks of lethal violence. Americans should diligently invest in re-education programs, representative legality, and gender-inclusive healthcare. As social justice movements usher global momentum, a standardized database of deceased TGE individuals and appropriate gender identification in the U.S. census must be adapted.

AHS-P7-2. Disability and Impairment of the Hand: Trauma Analysis of the Erie County Poorhouse Cemetery

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ABSTRACT
Hands are one of the most frequently used parts of the body and, as such, are historically and intrinsically linked to daily functioning and the ability to work. Thus, the bioarchaeological analysis of hand bones can prove to be a useful resource in evaluating the lived experiences of past peoples. The current study analyzes antemortem hand trauma observed in individuals exhumed from the Erie County Poorhouse Cemetery (1851-1913), located in Buffalo, New York. In doing so we investigate patterns of trauma distribution and subsequent severity of impairment of the hand. These impairments are then used as a window into the occupational realities of the institutionalized poor in an Industrial Revolution era urban setting. Of the 271 individuals with observable hand bones, 42 (15.5%) displayed trauma in the form of a bone fracture, avulsion fracture, or joint dislocation. There were 55 females and 109 males, of which 5 (9%) and 24 (22%), respectively, displayed trauma. This was a statistically significant difference in trauma occurrences ($X2\ (1) = 4.197$, $p = .040$). These findings likely reflect occupational differences between men and women. When comparing hand trauma by side (e.g., left and right hand), a significant difference was found with more trauma on the right ($t = -1.972$; $p = 0.049$). Impairment scoring of the injuries revealed that individuals suffered mild impairment and subsequent disability of their hand(s). These impairments may be indicative of the hazardous, often unregulated workplace conditions of the time as well as potential instances of interpersonal violence.

AHS-P7-5. Telecommuting The Future Towards Better Air Quality: A Case Study of India

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ABSTRACT
This study aims to answer the question on whether telecommuting offers a plausible and desirable solution to mitigating air pollution in India's largest cities by looking at the causes of air pollution, its change during the pandemic, and how popular a remote work option is among India's educated class. With a burgeoning population of over 1.3 billion people and accompanying growth in their services sectors, remote work has already been on the rise within the country and there are promising projections for its growth. Current research on the improved environmental quality during the pandemic largely focuses on the shut-down of the industrial sector with little attention paid to the impact traffic congestion has on impairing air quality. This paper finds that lessening traffic congestion in India's cities leads to better air quality but may not be the most popular among workers and has overall significance for the health and safety of India's citizenry if policies are utilized to promote remote work.

AHS-P7-6. How a Well-Functioning Federal Public-Option Health Insurance Program could bolster Capitalism & the Free Market

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ABSTRACT
To submit a research paper that shows how a well-functioning public-option healthcare plan can increase economic output, raise GDP, and increase the life expectancy of the average American. A thorough review will be done looking at economic & social factors that a functioning, non-price gouging, and non-profit health insurance plan that is open to all American citizens can have deep positive effects on total productivity, wages, capital expenditures on meaningful investments by both firms & people, as well as juxtaposing the current system with one that is possible to achieve.

AHS-P7-7. It's a Bird! It's a Plane! No, It's a Feminist! Analyzing the Representation of Women in Comic Book Media

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ABSTRACT
Superhero media is a 27 billion dollar industry. Superhero media has played a significant role in contemporary pop culture and society. So, where does feminist thought – or the lack of feminist thought – belong in the conversation of comics? My research aims to pinpoint and define sexist tropes within comic book media, how they can be detrimental to the representation of women, and what viewers and creators alike can do to diminish this unsatisfactory treatment. My research uses textual analysis to examine the representations of female comic book characters across various mediums. The pathway to improvement is within the promise that audiences and comic book media creators continue to educate themselves on the inherent sexist themes of female comic book media characters; new media is created that shields itself from the typical misogynistic tropes that these characters have been subject to in the past, and comic book worlds fans do the work that it takes to show that these changes are not only appreciated but that they are in high enough demand to make them the new normal. The sexist injustices in comic book media need first to be acknowledged and then removed. Female comic book characters are free to be just as heroic and empowering or as daunting and frightening as their male counterparts.

AHS-P7-8. Teachers' Experience with Lack of Resources in Classrooms

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ABSTRACT
Teachers that are working in Nevada are experiencing problems with insufficient materials. The overall purpose of this study is to provide information about their struggles with materials in the Clark County School District. What are teachers' experiences with shortages of resources, and how does it impact their teaching strategies? Teachers' experiences are important to note. Their experiences matter in finding the problems they face is essential to aid them with suitable materials. Finding solutions to their needs will improve their teaching strategies and personal spending, but children will also get the proper materials they deserve. The selection was composed of three different teachers from three different schools within the Clark County School District. This study generates a qualitative understanding of teachers' experiences. Most teachers explained the different levels of frustration with the administration and the lack of resources they experienced. Analysis shows that this increases stress levels, personal spending, and teacher attrition. These methods and responses should help the administration improve the school system and express their employee's concerns to decision-makers to receive the proper and necessary resources. Certain limitations to this study are important to note, but the overall evidence proves that these problems negatively impact teachers' experiences.

OREO-1. Analysis of Supersonic Parachutes

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Ojas Kadam
Sebastian Yepez
Brittny Mikhaiel[2]
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ABSTRACT
Supersonic parachutes are entities that decrease the speed of reentry rocket capsules from supersonic to subsonic speed. Deceleration is an important aspect of re-entry, whether on earth or on other planets. Capsules, with a weight of 2400 kg, reach a speed of more than Mach 2 with less than 62 miles (ca. 100 km) of deceleration length. This puts greater emphasis on the importance of a parachute system that effectively accomplishes a safe landing. Currently, parachutes use nylon and fiber material for landing, however, little research has been conducted on the effectiveness of these materials. Experimental factors like max load, material used, stability, and sustainability are all factors that scale the effectiveness of a parachute design. Through the use of CFD and FSI simulations, as well as physical data collected from experiments, an optimal parachute design will be tested.

OREO-2. The Effects of Hypothalamic Stem Cell Degradation on Systemic Aging

Christian Rebolledo[1]
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[1]Sierra Vista High School
[2]Division of Research, Office of Undergraduate Research

ABSTRACT
Many aspects of human biological degradation have been attributed to the continual loss of stem cells throughout the course of an organism's life. One specific aspect is the underlying disease that is aging. Through the depletion of Sox-2-expressing hypothalamic stem cells (htNSCs), it has been correlated that the decrease of htNSCs results in loss of physiological, and biochemical function in mice specifically. The deductions stated throughout are through the compilation of studies across aspects like htNSC senescence, exosomal neural miRNA production, and protein-associated biological aging. As htNSCs produce exosomal miRNAs including CD81 and lncRNA Hnscr, neural function exhibited in mice has been found to be about 75% less effective in older populations (18 months of age in comparison to 3 months of age) producing fewer miRNA systems. Additionally, the YB-1 protein identified in mice (and humans) has been found to play a key role in the activation of cellular senescence in htNSCs, which through a decrease in specifically the lncRNA Hnscr, results in the compounding effects of systemic aging. These studies suggest that all together, a lack of htNSCs results in a lack of protein and exosomal miRNA systems in mice that aid in maintaining cellular stability. Since mice and humans seem to exhibit similar homology in regards to neural microbiology, it may be possible to reverse the effects of aging in humans through supplemental miRNA and Hnscr systems in vitro, as was done in mice, to further implement these studies in the future.

OREO-3. Potential Effectiveness of Bacterial and Plant Bioremediation at Restoring Heavy Metal Polluted Soil

Viktoriia Udovichenko[1]
Amy Choi
Nicole Jensen
Nikki Adams
Brittny Mikhaiel[2]
Faculty Mentor: Levent Atici, Ph.D.[3]
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ABSTRACT
Heavy metal pollution in soil affects not only human health and agriculture but also plant growth, plant genetics, and microbial communities. Solutions such as bioremediation have been proposed, entailing the introduction of microorganisms and plants that can break down pollutants. This study will analyze a variety of peer-reviewed academic journals to assess the viability of using bioremediation to combat heavy metal pollution. In situ bioremediation techniques have proven more effective than ex situ techniques or bioreactors (Vidali, 2001). This study specifically covers two types of in situ bioremediation: microbial and plant bioremediation. The effectiveness of using different bioremediation techniques will be evaluated in terms of adverse effects on the microbial ecosystem within the soil, the time taken to decontaminate the soil, and other factors that should be considered.

OREO-9. The Impact of Mask Wearing Upon The Epidemiological Transmission Dynamics of COVID-19 in Nevada Public Schools

Iris Cong[1]
Shayaan Zaidi
Nicole Whan
Brittny Mikhaiel[2]
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ABSTRACT
COVID-19 is an infectious disease which is caused by the coronavirus SARS-CoV-2, which likely mutated from infecting animals to infecting humans. The first case was reported in December 2019, leading to the outbreak of the COVID-19 pandemic. The effectiveness of facial coverings in preventing the spread of the virus has been consistently questioned by the public. Along with a lack of full knowledge concerning epidemiological transmission of COVID-19, students becoming infected by the virus is a new concern for youth in school. The primary goal of the study is to synthesize known information about general mask effectiveness in regards to COVID-19 transmission dynamics in public schools with local student statistics concerning the spread of COVID-19 in Nevada public schools. This is done in an effort to both explain the rise in COVID-19 transmission across Nevada public schools and to address the importance of mask wearing in these schools as a means of combating the increased spread of COVID-19.

HNSE-L1-1. Validation of Sweat Rate, Fluid Loss, and Sodium Loss in Wearable Technology

Macy Helm[1]
Bryson Carrier[1]
Faculty Mentor: James Navalta, Ph.D.[1]
[1]School of Integrated Health Sciences, Department of Kinesiology and Nutrition Sciences

ABSTRACT
Sweat rate, fluid loss, and sodium loss directly impact performance during prolonged exercise bouts. The Gatorade Gx Sweat Patch (Gx SP) is a wearable device that tracks these metrics in the user. Having this information allows athletes to strategize their fluid and electrolyte consumption. This randomized and counterbalanced study will determine the validity and accuracy of the Gx SP's prediction of sweat rate, fluid loss, and sodium loss compared to lab-based measurements. Healthy runners and basketball players will be recruited to participate in two running sessions on a treadmill. Participants will be asked to run at low-intensity and moderate-intensity, determined by heart rate reserve. Hydration status and sodium loss will be determined pre-and post-exercise via body weight, bioelectric impedance analysis (BIA), and urine and blood samples. While running, the participant will wear the Gx SP, an additional absorbent gauze pad, and a heart rate (HR) monitor. Running intensity will be monitored by HR and corresponding HRR values. After completing the exercise, sweat rate, fluid loss, and sodium loss will be generated via the Gx SP. The absorbent gauze will be analyzed for sodium loss. Body weight and blood and urine samples will be obtained again and compared to the pre-test samples. Participants will return within 2 to 14 days to complete the opposite running condition. To determine the validity of the device, the validation criteria for the Gx SP is: $p > 0.05$, mean absolute percentage error < 10.0%, Pearson Correlation > 0.70, and Lin's Correlation Coefficient Concordance > 0.70.

HNSE-L1-2. Analysis of High Performance Nanoparticle Based Thin Film Solid Batteries

Anayeli Flores-Garibay[1]
Faculty Mentor: Biswajit Das, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Electrical and Computer Engineering

ABSTRACT
In recent years, the production of lithium batteries has increased because of the recent push to move away from the use of fossil fuels. Despite this increase in lithium battery technology there are some major drawbacks. For instance, liquid electrolyte lithium-ion batteries can present a potential risk of fire hazard if damaged or handled improperly and are known to be toxic causing a potential risk to the environment and water supply. To overcome these problems, there has been an increase on the research and production of fully solid-state batteries. Solid state batteries are known to have longer life cycles, wider operational temperature ranges and present no threat of fire hazard because of the absence of flammable fluids. An important type of solid-state battery is the thin-film solid state battery (TFSSB) which is commonly used in Internet of Things (IoT), wearable sensors, devices, and implants. In this project we conduct a literature review to analyze the best thin film materials for the anode, cathode, and electrolyte layers for use with nanoparticle technology developed at the Nevada Nanotechnology Center at UNLV.

HNSE-L1-3. Development of a Mobile App for Project Management and Presentation

Jiaqi Li[1]
Faculty Mentor: Jorge Cacho Fonseca, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Computer Science

ABSTRACT
There is much information about research projects in the Economic Department. However, managing projects with different sizes is not easy. To solve this issue, we create a "showcase" app that has a functional database and user-friendly interface. It is very efficient and convenient. Users can extract information from the projects with filters. We use Unity platform to create the "showcase" app and SQL database to store and manage the data. Authorized users can edit, add, and delete the information of their projects in the app. The database is safe and protected. All of the information could be updated and shared among the users immediately. The app also has a rating system that helps us make future improvements.

HNSE-L1-4. Effects of Recycled Asphalt Binder on the Viscosity of Recycled Asphalt Binder and Mixtures

Abdulrahman Alahdal[1]
Faculty Mentor: Moses Karakouzian, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Civil and Environmental Engineering and Construction

ABSTRACT

Asphalt pavement is a combination of materials that are typically used in the construction of roads, highways, airports, parking lots, etc. Asphalt pavement consists of asphalt binder, mineral filler, and a mixture of aggregates such as crushed rocks, sand, slags, and gravel. These components are produced with a great deal of energy which results in significant CO2 emissions. In this study, the viscosity of virgin and reclaimed asphalt binders, as well as reclaimed asphalt binders and virgin asphalt binders' mixtures, are examined according to the testing protocol and specifications of the American Association of State Highway and Transportation Officials (AASHTO). Results from this study will allow reclaimed asphalt to be used in asphalt mixtures to the greatest extent possible. Carbon dioxide (CO2) emissions directly increase as asphalt production grows. As a result of studying the effects, we will be able to increase the proportion of reclaimed asphalt pavement used in new asphalt pavement mixtures, which in turn will decrease the yearly CO2 emissions. To maximize asphalt pavement's strength and resistance, it is crucial to maintain its viscosity, since asphalt binder is responsible for holding aggregate together. We found that the viscosity of the mixtures containing 5 to 30% reclaimed asphalt binder decreased linearly as the percentage of reclaimed asphalt binder increased. Despite this, specimens with 30 to 50% reclaimed asphalt binder show an increasing viscosity as the amount of reclaimed asphalt binder increases. Accordingly, reclaimed asphalt should account for approximately 5-30% of the total mix of asphalt.

HNSE-L2-1. Validation of the Garmin Fenix 6S Maximal Oxygen Consumption (VO2max) Estimate

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Bryson Carrier[1]
Dustin W. Davis[1]
Kyle Cruz[1]
Brenna Barrios[1]
Faculty Mentor: James Navalta, Ph.D.[1]
[1]School of Integrated Health Sciences, Department of Kinesiology and Nutrition Sciences

ABSTRACT
Sweat rate, fluid loss, and sodium loss directly impact performance during prolonged exercise bouts. The Gatorade Gx Sweat Patch (Gx SP) is a wearable device that tracks these metrics in the user. Having this information allows athletes to strategize their fluid and electrolyte consumption. This randomized and counterbalanced study will determine the validity and accuracy of the Gx SP's prediction of sweat rate, fluid loss, and sodium loss compared to lab-based measurements. Healthy runners and basketball players will be recruited to participate in two running sessions on a treadmill. Participants will be asked to run at low-intensity and moderate-intensity, determined by heart rate reserve. Hydration status and sodium loss will be determined pre-and post-exercise via body weight, bioelectric impedance analysis (BIA), and urine and blood samples. While running, the participant will wear the Gx SP, an additional absorbent gauze pad, and a heart rate (HR) monitor. Running intensity will be monitored by HR and corresponding HRR values. After completing the exercise, sweat rate, fluid loss, and sodium loss will be generated via the Gx SP. The absorbent gauze will be analyzed for sodium loss. Body weight and blood and urine samples will be obtained again and compared to the pre-test samples. Participants will return within 2 to 14 days to complete the opposite running condition. To determine the validity of the device, the validation criteria for the Gx SP is: $p > 0.05$, mean absolute percentage error < 10.0%, Pearson Correlation > 0.70, and Lin's Correlation Coefficient Concordance > 0.70.

HNSE-L2-2. Augmented Reality Indoor Navigation

Ilya Pivavaruk[1]
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[1]Howard R. Hughes College of Engineering, Department of Computer Science

ABSTRACT
Augmented reality has been on the rise in popularity within the computer science field. It is used for displaying virtual objects in reality through devices' cameras. Indoor navigation has been a subject for experimentation with the use of augmented reality but it has been heavily reliant on various beacon systems to keep track of the user in virtual space. We decided to attempt to create an augmented reality application that would fulfill the role of indoor navigation without the need for any external hardware. We used Unity and AR Foundation to create an application that would use optical character recognition on nameplates and micro-adjustments to locate and guide the user to their destination. The testing is currently being done by asking students to use the app to reach certain destinations. Once they are done they record their experiences with the app. This application is made by experimentation of different approaches to indoor navigation. Hopefully, the research that we've done and the innovative ideas we put into this application can help advance the field of augmented reality and indoor navigation.

HNSE-L2-3. Post-zygotic Reproductive Isolating Barriers Contributing to Metrosideros (Myrtaceae) Divergence

Jaclyn Martinez[1]
Faculty Mentor: Elizabeth Stacy, Ph.D.[1]
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ABSTRACT
On the Hawaiian Islands, Metrosideros (Myrtaceae) is a landscape-dominant woody species complex that includes a surprising number of interfertile varieties, races and species. These many taxa appear to represent ongoing population divergence and speciation, in which we suggest there may be postzygotic reproductive barriers relating to hybrid incompatibilities that contribute to speciation. This project examines rates of embryo development and seed germination as indicators of postzygotic isolating barriers in Hawaiian Metrosideros. We optimized laboratory methods for each measure and applied them to examine preserved seeds of pure-taxon crosses and hybrid crosses (i.e., crosses between taxa or involving F1 hybrids). After batches of seeds from both cross types are imported and rehydrated, the proportion of developed embryos is recorded under a dissecting scope. Seeds are then germinated on filter paper in a petri dish, watered and sealed with parafilm, and placed under full spectrum LED light. The proportion of seeds germinated (i.e., standing plants with two leaves) is recorded every two weeks for six weeks. This project seeks to provide insight into the role of early life-history stages in the evolution of reproductive isolating barriers in a hyper diverse, hybridizing tree species complex.

HNSE-L2-4. COVID-19 Vaccine Hesitancy in the United States: Evidence in Late 2021

Ambree Schoetker[1]
Faculty Mentor: Manoj Sharma, Ph.D.[1]
[1]School of Public Health, Department of Environmental and Occupational Health

ABSTRACT
The coronavirus disease, COVID-19, has changed daily life dramatically since early 2020. Although COVID-19 vaccines are available in the United States, many express distrust in this primary prevention public health measure and doubt as to the seriousness of COVID-19 and associated morbidity and mortality. Vaccine hesitancy, also described as the reluctance or refusal of vaccines despite availability, exists on a continuum and was a known public health threat prior to the coronavirus pandemic. This narrative review examines studies related to the determinants of COVID-19 vaccine hesitancy among adults in the United States. Also explored are the factors related to COVID-19 vaccine risk communication and available interventions to address COVID-19. Perceived severity of and susceptibility to COVID-19, trust in public health authorities and government in general, educational attainment, income, race, and sex were found to be significant determinants of vaccine hesitancy. Due to lack of available evidence-based interventions to counter COVID-19 vaccine hesitancy, peer-reviewed commentaries and other health communication principles formed the basis of additional recommendations for COVID-19 vaccine hesitancy interventions. Recommendations included trust-building efforts at the community, national, and institutional levels as well as addressing social determinants of health. The results of this narrative review may likely be limited by recent vaccine mandates related to education and to employment. Future research is needed to identify any changes in acceptance, uptake, and trust in institutions such as public health agencies and universities and representatives of those institutions.

HNSE-O1-1. Preliminary Analyses of Fatal Bicyclist Crash Characteristics in the Western US

Allyson Deijkers[1]
Faculty Mentor: Shashi Nambisan, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Civil and Environmental

ABSTRACT

This presentation summarizes preliminary analyses of some factors related to fatal bicyclist crashes. It focuses on urbanized counties in California, Nevada, Oregon, and Washington for the years 2008-2018. Key variables analyzed include state and county, crash location (at intersection, on roadway, on shoulder, etc.) and lighting conditions (day/night). The National Highway Traffic and Safety Administration's (NHTSA) Fatality Analysis Reporting System (FARS)'s data were used for the analyses. Results show commonalities and differences across the counties. In Nevada, Clark and Washoe counties had most of their crashes during daylight conditions, on the roadway. In California, results vary across the state. Yolo County had most of their crashes on the roadway, and not intersection related. San Diego County had half of their crashes under daylight conditions, on the roadway. San Francisco County had most of their crashes under daylight conditions, on the roadway, and at an intersection. Sacramento County had half of their crashes under daylight conditions, on the roadway, and not at an intersection. Los Angeles County had half of their crashes under daylight conditions, on the roadway. Multnomah County, Oregon had most of their crashes under daylight conditions, on the roadway. King County, Washington had most of their crashes under daylight conditions, on the roadway, with a slight majority at an intersection. The results indicate that other factors such as roadway and bicyclist characteristics also need to be integrated in the analyses. These will be explored next to help develop and deploy appropriate countermeasures to enhance bicyclist safety.

HNSE-O1-2. How Facial Features and Head Gesture Convey Attention in Stationary Environments

Janelle Domantay[1]
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[1]Howard R. Hughes College of Engineering, Department of Computer Science
[2]Howard R. Hughes College of Engineering, Department of Electrical and Computer Engineering

ABSTRACT
Awareness detection technologies have been gaining traction in a variety of enterprises; Most often used for driver fatigue detection, recent research has shifted towards using computer vision technologies to analyze user attention in stationary environments such as online classrooms. This study aims to extend previous research on distraction detection by analyzing which visual features contribute most to predicting awareness and fatigue. We utilized the open source facial analysis toolkit OpenFace in order to analyze visual data of subjects at varying levels of attentiveness. Then, using a Support Vector Machine (SVM) we created several prediction models for user attention and identified Histogram of Oriented Gradients (HOGS) to be the greatest predictor of the features we tested. We also compared the performance of this SVM to deep learning approaches that utilize Convolutional and/or Recurrent neural networks (CNN's and CRNN's). Interestingly, CRNN's did not appear to perform significantly better than their CNN counterparts. While deep learning methods definitively performed better, SVMs utilized less resources and, using certain parameters, were able to approach the performance of deep learning methods.

HNSE-O1-4. Development of Experimental Rocket for Component and Payload Acceleration Load Testing

Drew Nemeth[1]
Jake Pettitt[1]
Faculty Mentor: Brendan O'Toole, Ph.D.[1]
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ABSTRACT
With a burgeoning commercial space industry in the United States, more reliable and cost effective methods for qualifying critical flight components are required in order to reduce the costs of spacecraft development programs. Electronic payloads designed to undergo high acceleration loading during military and civil rocket flight have proven especially difficult to properly flight test prior to operational use. This paper describes the design, construction, flight testing, and post-flight analysis of a single stage launch vehicle with an intended apogee of 50,000 feet and maximum velocity in excess of Mach 2 with a simulated electronic payload. Software suites including OpenRocket, RasAero, and AeroFinSim were utilized in order to confirm rocket stability, a projected flight outline, and structural integrity of the airframe and fin composition/attachment that commonly fail during supersonic flight regimes. The airframe was primarily constructed of G12 filament wound fiberglass tubing in addition to a composite fin can centered around CNC'd G10 fiberglass cores with a wet carbon fiber layup by hand. Flight roll control was achieved via the onboard reaction wheel, which was constructed of 3D printed components and inertial measurement sensors. The completed vehicle experienced a successful flight to 42,000 ft, maximum velocity of Mach 2.2, and maximum acceleration of 16 G. The airframe and all components were safely recovered and in working order post-flight. A successful test of the simulated electronic payload was performed and a low cost flight verification method was established.

HNSE-O1-5. Integrating Crash Datasets to Facilitate Traffic Safety Analyses

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ABSTRACT

Traffic crashes are of significant concern to society. Understanding key factors related to traffic crashes is critical to develop strategies to enhance road safety. Factors include attributes related to the crashes, persons and vehicles involved, and environmental conditions. These data are based on reports and records maintained by multiple agencies at the local, state, and national levels. Unfortunately, such data are not readily available in an integrated manner. The Nevada Department of Transportation (NDOT) consolidates and captures in a digital format crash reports filed by individual law enforcement officers and their agencies. NDOT's database has separate subsets for attributes related to crashes, persons, and vehicles with a common field linking two of these three subsets. A consolidated database is required to perform the desired analyses. This presentation will summarize the steps needed to integrate the individual data subsets into one consolidated database using data obtained from NDOT for the years 2015 to 2019. It will demonstrate an automated procedure to develop the consolidated databases. Next, it will highlight the process to georeference data for individual crashes and link them to the crash attributes in a GIS environment. In addition, the presentation will touch upon challenges and issues related to integrating individual data sets and to incorporating them in a geographic information system (GIS) environment. Future work includes developing queries and conducting statistical analyses to answer hypotheses regarding similarities and differences in road safety outcomes based on spatial and temporal characteristics

HNSE-O1-6. Qualitative Analysis on Implicit Bias Against Patients of Color in Healthcare

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ABSTRACT
People of color (POC) from stigmatized and marginalized communities face implicit bias in healthcare. Implicit biases are unconscious attitudes and internalized discrimination developed through repeated practices based on stereotypes from a foundation of structural discrimination. Implicit bias in clinical settings impacts an individuals' quality of care and overall health outcomes. The study aimed to characterize and address implicit bias among healthcare professionals toward POC in clinical settings. A literature search in MEDLINE/PubMed, CINAHL, and EBSCO databases was undertaken to include all peer-reviewed studies (2011-2021) about implicit bias toward POC. The original literature search located 121 peer-reviewed articles. Out of those, 20 literature articles met the inclusion criteria. Patients of color disparities are often due to the lack of access to health care/insurance, the quality of care/treatment received, and overall health outcomes. Additional factors include gender, age, mental illness, weight, disability, sexual orientation, AID status, socio-economic status, and social circumstances. Most healthcare providers appear to have an implicit bias in terms of positive attitudes toward Whites and negative attitudes toward POC. Future studies need to employ more rigorous methods to examine the relationship between implicit bias and healthcare outcomes. Interventions targeting implicit attitudes among health care professionals are needed because implicit bias may contribute to health disparities and the overall clinical care of POC. Educational initiatives, reformed policies/practices, and new research are needed. Acknowledging racial/ethnic, cultural, and religious bias in clinical settings minimizes implicit bias and reduces negative health care experiences for POC.

HNSE-O2-1. Characterization of Neuronal Protein-protein Interactions using Baits from the 15q11.2 Locus

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Ching Lan (Lanie) Chang[2]
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ABSTRACT
The 15q11.2 microdeletion syndrome results in neurodevelopmental deficits that include developmental delay and psychiatric conditions. While comprehensive microarray studies have demonstrated that four genes (NIPA1, NIPA2, CYFIP1, and TUBGCP5) within the 15q11.2 locus are associated with behavioral and anatomical pathology, a unifying hypothesis to correlate gene function to phenotype has not been established. Copy number variations within chromosome 15 are relatively frequent in approximately 1% of the population. An increasing number of genes are associated with intellectual disability (ID) and autism spectrum disorders (ASDs). Fragile X mental retardation gene 1 (FMR1), whose silencing causes the Fragile X syndrome, is the most common form of ID and autism. The precise functional significance of the CYFIP/FMRP interaction is not understood fully; however, among the interactors of FMRP, CYFIP1/2 are good candidates for ID and autism, based on their genetic implication and functional properties. CYFIP1 and CYFIP2 represent a link between Rac1, the WAVE complex, and FMRP, favoring the cross-talk between actin polymerization and translational control. Thus, the role of Cyfip1 in brain connectivity is yet to be explored. Using mass spectrometry, immunoblotting, and immunoprecipitation datasets, we will characterize protein-protein interactions and mechanisms associated with the manifestation of neural disorders linked with the 15q11.2 microdeletion syndrome, and more specifically, with CYFIP1 copy number variation.

HNSE-O2-2. Relationships During COVID-19 Pandemic: Measuring Economic, Social, and Public Health-related Consequences on Intimacy and Satisfaction

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ABSTRACT
Amidst the COVID-19 pandemic, couples dealt with tremendous challenges such as financial insecurity, social seclusion, and an onset of public health restrictions. The pandemic has exacerbated many existing and novel stressors affecting couple intimacy and satisfaction. Extant literature reveals financial strain and social isolation induced by a stressful event, like a health crisis or natural disaster, influences relationship contentment; however, behaviors towards public health restrictions have not been explored. The aim of this study was to evaluate how pandemic-related stressors, namely financial strain, social isolation, and public restriction behaviors, influence relational intimacy and relationship satisfaction. The study sample (N=160) consisted of mostly college-aged females (M=25, SD= 8.66) with an average relationship length of 4.31 years (SD= 5.36). Using a multiple-regression two-dependent variable model, the contribution of each pandemic-related measure to variance level was assessed while the junction of the three stressors was associated with intimacy and satisfaction. Results indicate combined COVID-related stressors had a negative association with relational intimacy and relationship satisfaction. Social isolation contributed the most variance (15%) to the level of relational intimacy and relationship satisfaction (R2= 0.151). A comprehensive discussion on the long-term implications of social isolation on couples is provided. Additional insight is presented on how couples and family therapists provide coping strategies and interventions for distressed couples.

HNSE-O2-3. Development of a Novel Alzheimer's Therapy: Reduction of Inflammation

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ABSTRACT
Alzheimer's disease is a progressive neurodegenerative disease affecting about 5.8M Americans and nearly 48M people worldwide. Currently, there is no cure for Alzheimer's. Available treatments only address the cognitive and behavioral symptoms but do not delay or stop the progression of the disease. One characteristic of Alzheimer's is the deposition of amyloid beta plaques in the brain. Clearance of these plaques involves receptors on the cell surface whose activation results to the release of harmful inflammatory factors. This leads to the eventual death of nerve cells. At the Caberoy Lab, we develop a novel Alzheimer's therapy through amyloid beta clearance without causing inflammation by using the hybrid protein that we have engineered. We have previously demonstrated that our hybrid facilitated amyloid beta clearance. So our main question here is, can our hybrid reduce inflammation in Alzheimer's disease? We observe a significant reduction in levels of harmful oxidative and inflammatory factors in the presence of our hybrid compared to the control. This implies that our hybrid does not only facilitate clearance of plaques but also reduce inflammation. Our promising result is very exciting as we join the race in developing a cure for Alzheimer's disease.

HNSE-O2-4. Evolutionary Analysis of NLR Genes in Metrosideros through Comparative Genomics

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ABSTRACT
Plants rely heavily on innate immunity toward pathogens due to the fact that many of them do not contain specialized adaptive immune system cells. In order to mount proper immune responses, plants must come up with several broad defense mechanisms. One such mechanism in these plants, nucleotide-binding domain & leucine-rich repeat (NLR) proteins, are key players when it comes to intracellular immune-related functions. While the biological functions and protein structure of NLR genes are similar across species, variation in NLR gene numbers and sequences among closely related plant taxa can play a key role in diversification and the evolution of reproductive isolating barriers. In this study, we examine variation in NLR genes within Hawaiian Metrosideros (Myrtaceae), an incipient adaptive radiation of woody taxa that show partial isolating barriers. By using NLR annotating software tools, examining the number of NLR genes through code, mapping these genes to their respective chromosomes, and looking at synteny between taxa, we hope to glean insight into the evolution of NLRs in Metrosideros and how variation of these NLR-mediated mechanisms may potentially confer reproductive isolation within taxa. Preliminary results suggest that pubescent Metrosideros taxa may have a greater number of NLR sequences than glabrous taxa while also varying in their distribution across chromosomes. Future synteny analysis will provide a framework for examining variation of these homologous genes and help to establish if gene order is a significant factor of NLR variation among different species.

HNSE-O2-5. Testing for a Smad Requirement in Wnt Signaling in Drosphila Embryos

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ABSTRACT
Cells communicate by producing molecular signals that activate a signal-specific pathway to elicit a response in neighboring cells. Signaling pathways share similar elements that include the signal and receptor, and intracellular components to relay the signal and effect a change in gene expression. Two signaling pathways, the Wnt pathway and the Bone Morphogenetic Protein (BMP) pathway, which contribute to the establishment of body plans for all multicellular animals, have been thought to be independent of one another. However, recent evidence suggests that the Wnt and BMP pathways share a signal transducer that has a necessary function in both pathways. This hypothesis has not yet been tested with the definitive genetic method of using a genomic deletion. This is a progress report of such a definitive test. I am testing whether Mad is required in both the BMP and Wnt signaling pathways using the Mad[KO] allele to generate Drosophila embryos that lack Mad. Whether Mad is required for Wnt responses will be determined by examining the denticle belt patterns of exoskeletons from embryos that lack Mad. The denticle belt pattern will be compared to that of embryos that lack the signals necessary for either the BMP or the Wnt pathway. The results obtained will provide critical evidence for whether Mad functions only in the BMP signaling pathway, or both BMP and Wnt signaling pathways.

HNSE-O2-6. Interrogating a Centrosomal-specific Role for DDX3X During Brain Development

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Ching Lan (Lanie) Chang[2]
Richard Gu[3]
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ABSTRACT
DEAD-box proteins are RNA helicases that are characterized by a conserved Asp-Glu-Ala-Asp motif. These proteins are involved in a variety of processes within cells, ranging from cell cycle progression to the innate immune response. DDX3X is a protein-coding gene found on the X chromosome that codes for a DEAD-box RNA helicase and variants in this gene are believed to be involved in 1-3% of unexplained intellectual disabilities in females. The DDX3X protein is vital for cell viability and is found in all tissues within the body. While mutations in the human DDX3X gene have been characterized to cause intellectual disabilities, seizures, and autism, the mechanism that associates the genetic lesions to pathology is still under investigation. Here, we use mass spectrometry to characterize a complex interactome of DDX3X in the mouse brain. We also verify the novel interactions using immunoblotting techniques and show that phenotypes associated with loss of function DDX3X mutations can be explained through some centrosomal proteins identified in our screen. The data suggest that the loss of DDX3X from the centrosome can perturb neuronal development.

HNSE-O2-7. Factors Associated With Telemedicine Usage And Acceptance Pre- and Since COVID-19

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ABSTRACT
The COVID-19 pandemic has acted as a catalyst for telemedicine uptake among both healthcare providers and patients. Prior research rarely has examined the lack of patient uptake of telemedicine. Known systemic barriers to accessing telemedicine in the U.S. before the COVID-19 pandemic may play a large role in its uptake. The purpose of this study is to assess the factors associated with the usage and acceptance of telemedicine pre- and since the COVID-19 pandemic. In this cross-sectional study, data was collected from persons residing within the U.S. who are 18 years of age or older using an online survey. Using an integrated model of the Theory of Planned Behavior and Technology Acceptance Model, this study measured barriers to accessing telemedicine before and since the COVID-19 pandemic as well as the six constructs of the model. Descriptive statistics and logistic regression were calculated. In the model examining predictors of telemedicine use before COVID-19 ($p<0.001$), racial/ethnic identity ($p<0.05$) was the statistically significant predictor. In the model examining predictors of telemedicine use since COVID-19 ($p<0.001$), devices used to access telemedicine since COVID-19 ($p<0.05$) was the statistically significant predictor. Gender identity, employment status, healthcare status and selected constructs of the integrated model were among the variables not statistically significant in either regression model. These findings contribute to the existing literature regarding barriers to telemedicine uptake among patients in the U.S. Future studies should focus on making the survey more accessible to non-English speakers and communities with limited Internet access.

HNSE-O3-1. Highly Sensitive Capacitance Measurements of 2D Materials

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ABSTRACT
The quantum anomalous hall effect (QAHE) is a phase of matter in which a dissipationless current is made to flow around the edge of a two dimensional (2D) material. Making use of this effect for next generation electronics could lead to faster processors and low power devices. There are very few materials that exist in nature that intrinsically possess the QAHE, however by sandwiching target 2D materials together we can establish this highly sought after phase. By using three 2D materials: graphene, molybdenum disulfide (MoS2) and chromium tri-iodide (CrI3) forming a van der Waals heterostructure we can create a proximity induced magnetism effect. Here, we took highly sensitive capacitance measurements of graphene on MoS2 devices at low temperatures and high magnetic fields. By taking measurements of the penetration field capacitance vs charge density and polarization of a graphene and MoS2 device at 2 Kelvin and zero external magnetic field, we are able to see the charge neutrality point in graphene and the conduction band of MoS2. Using this method of capacitance measurements we plan to integrate thin CrI3 flakes into our graphene and MoS2 devices to develop a full device to study the proximity induced QAHE.

HNSE-O3-2. Utilizing Muscovite to Create High Mobility Molybdenum Disulfide Transistors

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ABSTRACT
Molybdenum disulfide transistor devices were fabricated utilizing muscovite mica as dielectrics in order to test the hydrophilic behavior of mica. This was done by probing the device for its transconductance plot to show hysteretic patterns. Devices were fabricated using a clean van der Waals technique to stack two-dimensional materials into heterostructures. The devices showed a hysteretic trend in the transconductance curve. We compared the hysteretic behavior from mica with that of another well-known dielectric, silicon dioxide. The devices with mica dielectrics showed larger hysteresis in the gate sweeps than silicon dioxide. Devices utilizing mica as dielectrics are expected to have hysteretic behaviors due to the interfacial water on the mica surface. It is also speculated that water accumulation will continue to grow on the surface as long as the device is in ambient conditions, so the hysteresis may worsen over time. We aim to mitigate water absorption at the surface of mica and suggest future work to accomplish this goal.

HNSE-O3-3. Do All Fast Radio Bursts Repeat?

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ABSTRACT
Fast Radio Bursts (FRBs) are bursts of radio waves detected at great distances from space. Some FRBs are observed to repeat while some others not. One important question concerning astrophysicists today is whether all FRBs repeat. Recently, the Canadian Hydrogen Intensity Mapping Experiment (CHIME) published a master catalog of FRB detections for both repeating and non-repeating FRBs. This is the largest FRB database published to date. With the data in this catalog, we investigate whether repeaters and non-repeaters may show up as statistically different categories in certain parameter space. We focus on the FRB arrival time and fluence and study the repetition behavior in the fluence ratio vs. waiting time two-dimensional space for each pair of bursts for repeating FRBs as well the lower limits of both parameters for non-repeaters. From this graph we can determine if repeaters and non-repeaters indeed occupy different phase spaces, which can shed light on whether they have distinct origins or rather form a continuum in terms of repetition rate, i.e. the apparent non-repeaters are simply repeaters with slower repetition rates.

HNSE-O3-4. Dynamics of Charged Matter With Magnetic Monopole Fields

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ABSTRACT
This project explores the dynamics of charged matter under the influence of a magnetic monopole field. Centuries of speculation has centered on the existence of magnetic monopoles. The lack of observational evidence of these particles has left us with a gap in our understanding of electromagnetism. Within Maxwell's equations, the equations that describe electricity are not symmetric to those that describe magnetism. Modern quantum theories for the fundamental constituents of matter demand that magnetic monopoles were created copiously in the early Universe. Despite many unsuccessful attempts to find evidence of their existence, efforts in that search continue. More recently, theoretical and laboratory studies have demonstrated how effective magnetic monopole structures can manifest in spin ices created in the laboratory. In this study, we explore the dynamics of charged matter in the environment of a magnetic monopole and calculate the radiation signature of that encounter. We propose that the latter serve as a diagnostic in laboratory and astrophysical searches for these elusive particles. We derive the equations of motion using conservation laws and provide analytic solutions to scattering events. We used the analytical results to verify the predictions of our numerical algorithm. We developed a robust program capable of providing accurate solutions under a wide variety of parameter settings. Our results confirm that the scattering trajectories lie on the surface of a cone, as previous studies have found under more restrictive conditions. Our approach has provided a comprehensive analysis of charged matter's motion and radiation signature in a monopole field.

HNSE-O3-5. Development of Novel Synthetic Methods of Lysine-Specific Demethylase 1(LSD1) Inhibitors as Anti-Cancer Reagents

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ABSTRACT
Cancer is the malignant growth and division of abnormal cells. The proliferation of cancerous cells is harmful to the human body since it interferes with many biological processes. Lysine-specific demethylase 1(LSD1) protein levels are expressed at high levels in many types of cancers such as teratocarcinoma, embryonic carcinoma, and embryonic stem cells. Gene expression in cancerous cells can be repressed by lysine-methylation on histones which ensures the maintenance of a tightly organized histone. Targeting LSD1 protein levels can significantly impair the growth of cancer due to the methylated histones being unable to participate in gene expression. Lysine-specific demethylase 1(LSD1) inhibitors prevent the proliferation of cancer by targeting the high concentrations of lysine-specific demethylases vital for cell proliferation. CBB3001 is a LSD1 inhibitor which has been able to inhibit the growth of cancer, warranting further investigation. The aim of this research project is to synthesize CBB3001 by developing efficient synthetic methods and to then create a CBB3001 derivatization library. The researchers involved will synthesize CBB3001, a LSD1 inhibitor, by developing several synthetic pathways with variability along specific steps to produce CBB3001 derivatives. CBB3001, and its derivatives, show great promise in functioning as anti-cancer reagents for many types of human cancers.

HNSE-O3-6. High Precision In-Situ Raman Spectroscopy on a Novel Room-Temperature Superconductor, Carbonaceous Sulfur Hydride, Under Pressure and Cryogenic Temperatures

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ABSTRACT
Superconductivity is an incredible quantum phenomenon that historically only occurred at low temperatures. Recently, room-temperature superconductivity was discovered and will have various benefits and advantages in application, such as revolutionizing the energy grid, making medical imaging more accessible, and solving problems in related sciences. We have experimentally investigated carbonaceous sulfur hydride (CSH), a novel room-temperature superconductor, at varying cryogenic temperatures and pressures through high precision Raman spectroscopy. The current understanding of the material lacks information about the chemical structure and stoichiometry. Investigating the temperature and pressure space of its Raman spectra will give insight on important details about its structure, chemical composition, and phase diagram while other investigative methods are not suitable. CSH was synthesized in a diamond anvil cell (DAC) and taken to 12 GPa at ambient temperature. Raman scattering data for CSH's vibrational spectra was collected on warm up from 10K to 293K at a pressure of 28 GPa. Various thermal broadenings, a temperature induced phase transition in the lattice mode region of the spectra, and present C-H modes at low temperatures are observed.

HNSE-P1-1. Comparison of Biochar Attained from Various Feedstocks for the Adsorption of Arsenic in Water

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ABSTRACT
Water is a fundamental human right, yet in many developing countries, it is a luxury. Water shortages and polluted water have become routine for millions of Venezuelans in the last two decades due to a failing economy and infrastructure mismanagement. According to the World Health Organization, arsenic (As) is a worldwide pollutant. Though it occurs naturally, As is toxic and may cause chronic poisoning with prolonged exposure. An estimated 4.5 million individuals in Latin America are chronically exposed to high levels of As (>50 μg/L), some up to 2000 μg/L. Biochar, a carbon-based material, effectively adsorbs and sequesters pollutants. However, the decisive argument for further investigation of this sustainable adsorbent is its production from locally available and inexpensive materials. Furthermore, due to its large surface area, biochar soaks up pollutants from water. This research evaluates the feasibility of using sustainable biochar to remove As from water. In this study, we selected various feedstocks, specifically sugarcane bagasse, peanut, and walnut shells, which are readily available biowaste in Venezuela. Each feedstock was pyrolyzed for a specific time and temperature under an inert (Ar) atmosphere to produce biochars. First, biochars were characterized using various techniques such as FTIR analysis, BET theory, SEM, and others. Then, comparative, temperature-controlled adsorption batch experiments were conducted to estimate the adsorption capacities of each biochar. Future research will focus on taking the highest As adsorbent and preparing a water filtration system that a small community could use, providing them with improved access to clean water.

HNSE-P1-2. Zeolite/ZVI System of the Treatment of Nutrients in Urban Runoff

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ABSTRACT
Algal blooms have taken place in Lake Mead, Nevada, and a major bloom occurred in 2001. One reason for algal blooms at Lake Mead is excess of nutrients from runoff water discharge during rainy seasons. Algal blooms in lakes and rivers are a sign of eutrophication – an excessive growth of plant life that leads to death of animal life from lack of oxygen. In addition, algal blooms impact the use of water as a drinking source because of the presence of algal toxins. Nutrients that cause algae bloom include ammonia, nitrate, and phosphorus. The objective of this research is to implement a passive system that removes nutrients from runoff water. If successful, such a system could be integrated into runoff street gutters to remove nutrients.
To test the viability of this system, a dual-media consisting of zero-valent iron (ZVI) and zeolite, was built. A synthetic runoff water solution is fed to the columns using a peristaltic pump. The synthetic runoff water composition mimics that of a typical runoff in Las Vegas. The system can be operated at retention times of 30 -180 minutes. The influent and effluent water to the column are sampled daily and the concentration of nitrate, phosphorus, and ammonia are analyzed to determine the effectiveness of the system. It is expected that ammonia will be removed in the zeolite and nitrate will be reduced by ZVI. In addition, microbes growing on the media might be able to remove phosphorus.

HNSE-P1-3. Literature Review: Review of Recent Developments of Bioremediation Applications to Ocean Oil Spills

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ABSTRACT
This paper explores recent developments in microbial remediation, specifically oil-degrading bacteria, and its potential use in ocean oil spills. Marine oil spills are a growing issue worldwide, due to its hazardous impact on both public and environmental welfare. Conventional oil spill management practices are inefficient, since significant amounts of oil remain in the water post-treatment. A possibly efficient and environmentally friendly solution is bioremediation, also known as microbial remediation. Bioremediation is a form of microbial enhanced oil recovery (MEOR), which is a biotechnological process that utilizes microorganisms to break down organic compounds, such as oil. By use of oil degrading bacteria, bioremediation applications may prove to be a feasible method in oil spill management. In this review, a systematic approach was used to find literature that could be analyzed to find which bacterial strains and supplementations would improve bioremediation as a method for mitigating ocean oil spills. It was concluded that certain bacterial strains are effective at degrading oil, given that certain metabolic and nutrient conditions are provided. Bacterial strains capable of decontaminating marine oil spills include Mycobacterium vanbaalenii, and Alcanivorax borkumensis, and Cycloclasticus, along with several others. Algae and dispersants used in conjunction with marine bacteria enhanced oil-degradation rates. However, more studies are needed to further investigate more potential bacterial strains capable of oil-degradation, and if other supplementations oil spill recovery in oil spills.

HNSE-P1-4. The Potential Health Effects of Bacterial Use in Self-Healing Concrete: A Systematic Literature Review

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ABSTRACT

In due course, structures developed from concrete create microcracks exposing it to degradation via the reinforcement steel's formation of ferric oxide. The aforementioned declines the loading capacity and lessens durability. A corrective technique used to counteract the effects above is bio-mineralization, self-healing the crevices with microorganisms' metabolic processes. Literature has explored some specific organisms used, and the research strongly supports that the existing bacteria used positively strengthen the concrete's durability. This literature analysis examines if the selected microorganisms: Sporosarcina pasteurii, Lysinibacillus sphaericus, Bacillus cereus, and Bacillus subtilis used in some current constructional methods will harm the health of consumers or those employees that have potential contact with those elements. Until this point, those strains used in this research appear to be nonpathogenic and safe to use with appropriate biosafety standards. Urease production was of concern due to its virulence factors, but the strains revealed no pathogenic outcomes within this review. After further examination, the concern for human health focused on the biological process that generates ammonium and carbonate via the urease enzyme within these bacteria. During the procedure of self-healing concrete, there is also a concern for ammonium exposure to employees and populations that live near these production sites. Ammonia exposure can cause bronchiolar and alveolar edema, depending on the amount consumed and the duration of human exposure. Sporosarcina pasteurii, Lysinibacillus sphaericus, Bacillus cereus, and Bacillus subtilis exhibit no apparent harm to healthy humans within the analyzed studies.

HNSE-P1-5. Isolation of Salt Tolerant Bacteria and Investigation of Perchlorate Biodegradation at High Salinity Conditions

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ABSTRACT
Perchlorate (ClO4-), known as a highly soluble oxidizer contaminant, has been detected in soil and groundwater throughout the United States for the last two decades. Biological reduction has been seen as a promising technology through which perchlorate reducing bacteria (PRB) occurring naturally in most environments utilize ClO4- as an electron acceptor. However, biological reduction of perchlorate is influenced by high salinity levels because the PRBs' activity is hindered at salinities over 1%. The goal of this study is to investigate the impact of salinity (NaCl: 0-6.5%) on perchlorate biological reduction. Actual soil samples from the contaminated site containing PRBs were used and acclimated in broths with different salt concentrations and later the cultures were tested on their reduction abilities using perchlorate (150 mg/L) as an electron acceptor (450 mg/L) and acetate as an electron donor. Gram-staining results revealed that there has been consistent growth of salt tolerant bacteria observed at each salt concentration level (0-6.5%). The variety of bacteria are displayed with the diverse shapes present under the compound microscope, from Gram-positive bacilli to Gram-negative cocci. However, it is important to consider that the reduction kinetic is slow even as the perchlorate reduction has been observed at 6.5% NaCl concentration. This will be further studied as the experiment is still running to obtain more promising results regarding perchlorate reduction and salt tolerant bacteria isolation. The conclusion drawn so far is that there are salt tolerant bacteria in this soil which can degrade perchlorate at environments with high salt concentration.

HNSE-P1-6. A Review on the Usage of Machine Learning Methods Gait Analysis and Possibility of a Portable Gait Analysis Device

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ABSTRACT
Gait analysis is a valuable tool for evaluating and monitoring an individual's walking pattern, which is used to recognize movement-related irregularities. Lately, machine learning methods have been introduced in the processing of the gait analysis data to help monitor and analyze the data. Given the increased interest in the area, this paper will focus on two parts: one is analyzing and reviewing the latest Machine learning Methods and sensors used, and the second is the possibility of a portable device capable of measuring and processing an individual's gait. The analysis of the Machine learning models and sensors papers illustrated that several algorithms and methods used had shown a possibility in helping to identify and monitor neurodegenerative disease, which is an excellent area for further research. Additionally, the second part of the study showed that a portable device capable of measuring and processing an individual's gait is possible and would be capable of data processing onsite. However, that device would have a disadvantage over the conventional gait analysis.

HNSE-P1-7. Deep Learning on Field Programmable Gate Array

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ABSTRACT
Field Programmable Gate Arrays (FPGAs) are a great candidate for implementing deep learning solutions with a focus on enhanced speed and size, due to their lower latency and minimal power consumption. This research aims to further elaborate on DL on FPGA boards due to the versatile architecture of the FPGA. The model FPGA board used for this project was A Xilinx PYNQ z2 as Xilinx offers vast repositories of DL resources which is helpful for exploring the benefits of performing DL on the FPGA. These tools include juptyer interface, python coding compatibility, and ease of cost. To implement deep Learning on the PYNQ z2 board, juptyer notebook was used to install virtual climates and download tools. Then code was implemented and weights were set. After testing different packages a image repository was used with 1000 images and was ran through the code. The research resulted in successful runs of AI guessing images based on a small pool of 1000 images. The research shows deep learning using FPGA boards is achievable and could be further improved.

HNSE-P1-8. Deep Learning on a Xilinx Kria KV260 Vision AI Field-Programmable Gate Array Platform

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ABSTRACT

Deep Learning (DL) has revolutionized research and development over the past ten years. Several challenges are that DL requires large power consumption and can be slow. Field Programmable Gate Arrays (FPGAs) are great candidates for implementing DL algorithms and solutions because they are configurable and offer low latency and low power consumption. In addition, the FPGA platform has on-chip memory and computation accelerators, for example adders, which decrease memory bottlenecks and helps to prevent memory and bandwidth issues. Furthermore, due to the versatile architecture of the FPGA, users can design application-specific hardware, instead of using general-purpose hardware found in a processor. The Xilinx Kria KV260 Vision AI (KV260) FPGA board was used for this project as it contains numerous accelerated applications for performing DL with a live camera feed. Three major DL solutions were used: Facial Recognition (FR), Figure Detection (FD), and Object Identification (OI). Overall, FR and FD performed well, but OI currently demonstrated low accuracy. Each DL solution had ten test cases with FR, FD, and OI having 90%, 82%, and 57% respectively. These results show that the KV260 can successfully implement a variety of DL solutions, especially as an edge device. A future implementation is to improve upon the current DL training models to provide better accuracy.

AHS-P2-1. Why is Ethiopia at War with Tigray

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ABSTRACT
EPRDF (Ethiopian People's Revolutionary Democratic Front) took control of the government in 1991, EPRDF consists of TPLF (Tigray People's Liberation Front), ADP (Amhara Democratic Party), ODP (Oromo Democratic Party) and SEPDM (southern Ethiopian's People's Democratic Movement). From the minority group of TPLF, Meles Zenawi become prime minister of Ethiopia from 1991 till his death 2012. Because of the prime minister ethnicity, TPLF become powerful and influential ethnic group in Ethiopia. All top government position in Finance, military, intelligence filled by Tigrayan. During his time all Tigrayans get special treatment in almost all aspect of the government from off record incentive such as access to the government service, tax breaks and soft regulatory oversight for those from Tigray ethnic group. This paper will investigate and analyze factors that leads Ethiopia to have a war with Tigray. My research uses comparative research method and use key interview in gathering relevant data. The finding of my research demonstrates that in 2018 Current prime minister Abiy Ahmed come to power and change Ethiopian democracy by releasing political prisoners, allowing political expatriate to come home, and lifting bans on press. This reform resulted TPLF to lose their power and leads to corruption investigation against TPLF. In response to that TPLF attacked the Ethiopian military base, soon after Ethiopia military start defending the country with the support of neighbor state like Amhara, Oromo. It is very important to discuss the underlying reasons for this war and the link of this war with economic and political power.

AHS-P2-2. Population Changes in the Syrian Arab Republic: 2010-2020

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ABSTRACT
This paper intended to study the population-related effects of the Syrian Civil War on the Syrian Arab Republic. The Syrian Civil War that started in March of 2011 is still on-going, along with the associated refugee crisis that arose from it. To determine the extent of the continued crisis, we decided to utilize population data to make inferences related to population growth, decay, and stagnation from the year 2010, through 2020. We found that during the initial stages of the Syrian Civil War, there were significant levels of population decay. However, by as early as 2015, the population decay had slowly begun to lessen, and by 2019, a marginal level of population growth had begun. By 2020, the population growth was nearing pre-war levels, and the level of population growth now makes the Syrian Arab Republic one of the fastest-growing countries worldwide. These findings should allow for a better understanding of the current situation within the Syrian Arab Republic. Particularly, this paper should assist humanitarian groups in understanding where to focus their resources. Additionally, this paper should provide government officials the data necessary to re-shape their policies towards refugee assistance and foreign aid.

AHS-P2-3. What Determines Musical Preference?

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ABSTRACT
Music is a universal interest in every human culture. It is evident that music plays a substantial role in the lives of people all over the world because it produces diversity among preferences, and it exhibits links to individuals' personality traits. After conducting our research, we aim to determine which factors influence an individual's choice in music. A problem we would like to address in our research is the preconceived notions individuals have based on a person's music taste. Our objective is to determine how personality and age influence musical predilections among different regions of the world. The methods we plan to utilize to conduct our research is to evaluate case studies, assess surveys, and conduct observational trials. The goal we want to achieve after research is conducted is to learn what gravitates individuals to pick certain music preferences. Some qualitative and quantitative data factors that indicate the results of the project are the diversity in personality types and age ranges. Our research is still in the works, but we anticipate our findings to give us more insight on what factors matter to individuals that lead them to pick a certain music style. This study is unique because it shows how diverse preferences in music are in different regions of the world and if those musical tastes are influenced by different factors depending on the region. Some broad implications we will discuss include common misconceptions of personality based on specific musical likings and why individuals prefer certain types of music.

AHS-P2-4. Daum Kakao Gaming Sales 2015-2020

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ABSTRACT
The video game industry is large with many companies having their hands in it. Very notable companies include Sony, Microsoft, Nintendo, and the famous South Korean based company Daum Kakao. In quarter four of 2020 the company made 140.8 billion won just off of its video game branch Daum Kakao Games. 140.8 billion won can be compared to about 119 million USD and that is in a singular quarter. My objective is to analyze why Daum Kakaos Games are so profitable. How gaming companies make a profit depends on what game model they use. Some companies just have the consumer buy the game for a flat amount, some release free games that have microtransactions built in. Daum Kakao has games such as Black Desert Online, PlayerUnknown's Battlegrounds, Path of Exile, and Eternal Return that they publish. I took a look at these games to see what sort of process they used to have players spend their money on the game and discussed with players of the game why they spend money. After looking into these games and talking with players I found they gain a large amount of their revenue from microtransactions made in game to get special cosmetics for your characters. These games are so profitable and successful in a market because they provide players with a way to customize and express themselves in an appealing way. It also allows them to show off to peers with what exclusive in game items they have obtained.

AHS-P2-5. Impact of COVID-19 on Tourism in Spain

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ABSTRACT
The objective of this analysis was to quantify the effects of the COVID-19 pandemic on the tourism industry in Spain by looking at Airbnb revenues and bookings, and to learn whether the Airbnb data could indicate if the industry was recovering. Airbnb has grown exponentially in popularity since the onset of COVID-19, and looking at Airbnb revenue and bookings may be more indicative of a country's tourism industry than looking at traditional hotels. Two open source datasets taken from Statista were used in this analysis: Airbnb revenue in Spain from 2015 & 2019 and COVID-19 impact on Airbnb bookings in the GB, France, Spain and Italy 2020-2021. The second dataset was filtered to show only the Spain data. From the first dataset, it can be seen that Airbnb revenue had a 181% increase in the span of four years. From the second dataset, it can be seen that when the first case in Spain was reported on January 31st of 2020, Airbnb bookings had experienced a sharp decline from the previous week, of 15%. After reaching an all time low during the week of March 30th, 2020, with a decline of 97% in bookings, there had been a steady increase until mid July of 2020. While the data is not steadily increasing, the overall trend does show that Airbnb bookings are increasing, though they are still about 20% less than the pre-COVID bookings of 2020. This data corroborates with the increase in tourism to Spain, which is 78% compared to 2020.

AHS-P2-6. The Relationship of Growing Deforestation Rates in the Brazilian Amazon and Various Factors

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ABSTRACT
In Brazil, the Amazon rainforest covers a massive area. Spanning five million square kilometers, it is frequently referred to as the "lungs of our planet". In June of 2021, a report portrayed the deforestation area in the Brazilian Amazon from 2004 to 2020. The data provides an objective view of the growing problem of deforestation in the Amazon. This paper will uncover the factors related to the increasing rate of deforestation. To uncover these factors, our research will determine which years held the biggest year-over-year rate increases, and we will then research changing economical, cultural, and political factors that could contribute to increases in the deforestation rate. In referencing the deforestation rates, it was determined that in 2016 and in 2019 there were major increases to deforestation. It was found that, in 2016, there were increased demands of crude oil in the US that drove increased deforestation. Additionally, in 2018, Jair Bolsonaro became the Brazilian president and rolled back environmental protection laws which lead to increased deforestation. In conclusion, 2020 saw Brazil report the largest area of primary forest loss. The implications of Amazon deforestation relate to climate change, endangered species, and conservation of ecosystems. Unfortunately the fate of the Amazon rainforest is tied to the overall state of political and economical mindsets in Brazil. In order for the fate of the Amazon to be rectified, a global effort should be made in order to enact laws to ensure the Amazon can remain the "lungs of our planet."

AHS-P2-7. The Market for Coffee in Finland

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ABSTRACT
Coffee is one of the most consumed beverages in the world. Finland ranked No.2 on the list of countries that are most addicted to coffee in 2020. The purpose of this research was to find out the impact of coffee consumption on imports, and the projection of the coffee market in Finland for the next decade. We examined data previously reported on various sources. By analyzing the changes in import frequency and share for each of Finland's main coffee suppliers from 2018 to 2020. This data will then be used to project the future impact on Finland's coffee importers for the next decade. The data collected on Finland's main coffee suppliers from 2018 to 2020 will be utilized in a simple linear regression analysis to forecast the relationship between the market for coffee in Finland and coffee imports into the country. While our results are still in process, the coffee market share is expected to grow in Finland. Coffee consumption has a positive impact on imports of the country.

AHS-P2-8. The Mexican Housing Market: An Analysis for Those Seeking to Buy Real Estate Property to Live in or Invest

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ABSTRACT
This research aims to investigate and better understand the Mexican Housing Market and provide information geared towards fundamental knowledge and or potential investment opportunities within the Mexican housing market. The focus is on the average housing price per Mexican State, the five highest, lowest, and the five leading travel destination states in Mexico. The median days on the market of the Mexican Housing Inventory and the increasing value of the residential market in Mexico were analyzed to give guidance for those interested in this market. Survey time period Data was collected, reviewed, and analyzed. Results show that the National Average price was $1,310,750.00 MXN ($64, 700.00 USD). The median days on the market have ranged from 22.5 days to 70 days since January 2021. The projected value of the residential real estate market for 2021 is $41.3 billion USD and is forecasted to continually grow in the coming years with a speculated $60 billion USD in 2025. The research shows that the Mexican housing market is growing and can be a competitive alternative for those looking to buy real estate property to live in or invest.

AHS-P3-1. Did You Eat Your Worms?!

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ABSTRACT
If Americans include insects as part of their diets, global pollution will decrease. Insects use less water to farm, produce 85% less methane than regular barn animals, and are packed with nutrition. As I analyzed the world population, I discovered that 80% of the world already eats bugs as part of their diets. It's especially popular in underdeveloped countries. Spreading the popularity to America will be difficult, as the most consumed meat is Chicken, Cows, and Pigs. These animals are mass produced and cause a huge impact on the environment. In conclusion, if we work together to bring insects in American meals, we can decrease global warming and create a sustainable environment.

AHS-P3-2. Unsustainable Fast Fashion in the United States

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ABSTRACT
My research will be focused on how unsustainable fast fashion is killing the ecosystem, whether or not it is bad for the environment and what percentage of it ends up in landfills? Boohoo, Shein and PrettyLittleThing are popular fast fashion retail apps among U.S consumers, cheap fast fashion tends to encourage consumers to over buy. My research will start with where does fast fashion come from and where does it end up? Fast fashion is based on trends going on in the red carpet, fashion shows or influenced by social media. Throwing away clothes because it is out of style should never be an option. Once people are done with a piece of clothing, they can give away their items, donate to thrift stores, or even resell their items. My research will explore ways on what consumers can do to decrease the percentage of fast fashion that ends up in landfills. The top 10 worst fabrics for the environment include cotton, polyester, nylon, acrylic, viscose, bamboo, acetate, and wool. These fabrics are considered bad for the environment because they do not completely break down and some micro plastics can make their way into the ocean and soil. One way to stop putting the blame on consumers is for brands to become more aware about how what they are doing and making is affecting the environment.

AHS-P3-3. Mexico Natural Disasters

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ABSTRACT
For centuries Mexico has faced numerous natural disasters that have taken a toll on the country's economy, human capital, and left the country in a state of uncertainty. When most people think back to some of the most devastating tragedies in Mexico, they may reflect on those such as Hurricane Wilma or the 1985 Earthquake. However, the Covid-19 pandemic may quickly surpass previous natural disasters and continue to contribute to the financial hardships in Mexico. Both qualitative and quantitative data show that Covid-19 has cost the country millions of dollars in healthcare, unemployment, and other additional expenses, leaving the country in a state of financial instability. As Covid started to become the global epidemic it is today, the unemployment rate in Mexico began to increase, increasing over one percent from May to June 2020. As of January 18, 2021, the cost of the pandemic has already reached 924 million dollars, nearly reaching the cost of the 1985 earthquake. The average cost to treat Covid in Mexico is $20,000, more than many people make in a year in Mexico. At-home treatment also costs around $3,000. Families have been financially ruined trying to fight for their loved ones' lives. If continuing at this rate the Covid-19 pandemic will surpass the 1985 Earthquake and Hurricane Gilbert in cost. This intense financial burden on the country and its citizens can leave the country heavily damaged in the short and long term future.

AHS-P3-4. Portugal's Home Ownership Rates with Covid-19

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ABSTRACT
Home ownership is a necessity to all people and with the recent global economic implications of Covid-19 this has become more difficult. This study will aim to explore the associations between the negative economical implications of Covid-19 and home ownership rates in Portugal. I analyzed home ownership rates in Portugal and economic statistics of Portugal including, unemployment rate, GDP, and core inflation from 2018-2020. Historical statistical information from Portugal was collected and observed to find patterns or correlations between Portugal's home ownership rate and their economy following the Covid-19 pandemic. Portugal saw its' home ownership rate drop by nearly a percent (0.8) from 2018-2020. Portugal's GDP, which accounts for 0.2% of the world's GDP dropped by over $10 Billion dollars from 2018-2020, while the country had an inflation rate of 1.5% in 2020, the highest in three years prior. Unemployment rates peaked at 8% in 2020. During the Covid-19 pandemic Portugal's economy was impacted negatively and its' home ownership rate followed suit. Portugal will need to look at lowering unemployment rates first to kickstart their economy into the post-pandemic era and ultimately bring home ownership rates up.

AHS-P3-5. The Challenges Navigated by Frontline Workers During Covid-19

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ABSTRACT
During the coronavirus global pandemic, the frontlines have navigated challenges of unprecedented market, social, and cultural disruptions. The objective of the study was to investigate different challenges experienced by the frontline workers during the early stages of the outbreak and what are the transformative changes in their jobs that they had to undergo from the first wave of the pandemic to the present. Here I conducted qualitative research among three frontline workers representing human services, education, and hospitality industries. They participated in semi-structured interviews by telephone. Interviews were audiotaped, transcribed, and analyzed manually. Six theme categories emerged from data analysis. Participants experienced physical, psychological, and financial distress, health concerns, social exclusion, and job insecurity. The most common challenge for all was the safety of their health and financial distress. Consequently, each of their jobs has transformed dramatically and employee morale has decreased for a lot of employees while others have realized the value of their job. The study found that frontline workers' resilience and the spirit of professional dedication despite being drained physically, emotionally, and financially during the covid-19 outbreak. This suggests the need to understand and target involvement for the specific risks and challenges faced by different groups of frontline workers in order to have a better contingency plan for future events of this nature. Strategies should be implemented to support and to meet the unmet needs such as physical and mental health, reasonable pay, job security, and the overall quality of life of the frontline workers.

AHS-P3-6. LGBTQ Community in Korea

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ABSTRACT
This research study pertains to the conservative views in Korea based on people's sexuality (LGBTQ). The goal is to understand Korea's history, political influence, and cultural background on why their views differ from the rest of the world in terms of discrimination against the LGBTQ community.
I analyzed the history of LGBTQ in Korea, including the Seoul Queer Parade. I also analyzed Korean politics that have a huge effect on people's opinions and cultural views. Additionally, I looked for the reasoning behind their social and cultural views on why they have homophobia and why they feel the need to result in violence, inappropriate or rude commentary, and sexual harassment.
Statistically, we can see that out of 8,336 people in South Korea who have taken the survey, 57% are still opposed to the LGBTQ community. It has gradually decreased over the years since 2013 by around 5%. Lesbians feel the need to balance their safety and visibility as they are targeted by Anti-LGBTQ activists. There are contemporary social movements in South Korea that exist to prove that same-sex marriages are formed due to the same type of love that heterosexual people have.
I conclude that the LGBTQ community within Korea is generally in danger, hence why most LGBTQ identified people choose to hide their sexuality. The conservative views in Korea are still causing homosexuality to be seen as abnormal. However, Korea is slowly accepting the LGBTQ community overtime thanks to the international influence that proves that the community exists.

AHS-P3-7. China's Important 2060 Carbon Neutrality Goal

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ABSTRACT
Climate Change is a serious threat to global security and well-being. Many developed nations and some developing nations have made promises to become carbon-neutral (net zero emissions), or carbon-free by a specified timeframe. China is a developing nation with high growth and has set a goal to be carbon-neutral by 2060. This study aims to determine how much China would need to reduce CO2 emissions to achieve this goal, and how it compares to other nations, using the most current data, and mathematical analysis. Chin
a produces the most CO2 in the world, almost twice as much as the United States, and accounts for 28 percent of world CO2 emissions. China would have to eliminate almost 500 million tons of CO2 emissions year over year to meet the 2060 goal. This represents an enormous challenge, especially considering China's CO2 emissions are still growing, but will be crucial to ensuring keeping total global temperature rise to 1.5-2 Celsius.

AHS-P3-8. Waste in China

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D'nasia Thompson[3]
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ABSTRACT
With a world full of inescapable garbage, how much is the emerging country of China producing and should the globe be concerned? As the most populous country in the world, China accounted for over 15% of the earth's waste volume in 2020. China has the biggest share of waste in the world, but is it enough for other countries to intervene?
Higher levels of greenhouse gas in the earth's atmosphere change its climate and some of these gases are linked to solid waste. These changes can result in more frequent, dangerous natural disasters (floods, hurricanes, mass species extinction, disease, etc.) and could damage communities all over.

AHS-P4-1. Italian Mafia and the Impacts it has on Society Today

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ABSTRACT
Cosa Nostra, or the Italian Mafia, the roots of the American mob and that way of life lead to the inspiration to the Godfather and so many movies. This Digital research poster dives into the state of affairs of the Cosa Nostra in Italy. How many organizations there are, were, and will be. It also studies the immense effect the mafia has on crime in Italy from homicides to corruption. This poster looks into five different data sets over the years focusing on the relationship between what type of crime is being committed to the potency of the mob at that time. Although the amount of crime and the number of families have gone down significantly since the ’80s. The mafia in Italy is still alive and well compared to its counterpart in the states, with, crimes such as homicides, murder, extortion, gambling, and so on.

AHS-P4-2. Singapore Waste Management

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ABSTRACT
With the constant population growth in such a limited land, Singapore is faced with multiple challenges in waste management. Over the last decades, Singapore aimed to strive for a zero-waste environment for its nation by reducing the significant amount of waste disposed of through recycling and maximizing landfills. The scope of this poster is to present whether Singapore has had an efficient control over its waste management in the last two decades. The poster took approaches to analyze statistics that concludes the recycle rates categorized into different classifications of waste disposals from 2003 to 2020 and average of total saved energy through the process of recycling. Overall, the findings suggest Singapore had an efficient waste management at the beginning with constant growth of recycle rate, but discrepancies are found starting from 2018 since the rate declined rapidly in three years. So coming to the conclusion that Singapore's efficiency on waste management control still has the potential to develop sustainable improvement. Visualizing these data can help Singapore's government to implement recycling policies that motivate people to improve their living environment.

AHS-P4-3. Most Popular Fast Food Places in Germany 2015-2019

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ABSTRACT
The top three fast-food restaurants in Germany are McDonald's, Burger King, and Nordsee. Even though Mcdonald's is by far the most popular, they have had a dramatic decrease in revenue and net income when compared to other fast-food brands since 2012. Based on the research we have conducted, we can explain why McDonald's is beginning to fail in one of its largest European markets. We learned that the main reasons for McDonald's Germany's decrease in revenue are consumers' changing preference in fast food dining and the increase in healthier alternatives from local competitors. What is unique about this situation is that despite Mcdonald's having control of most of the German market and a vast amount of resources and knowledge of operating in foreign countries, they continue to perform poorly when compared to their much smaller competitors. However, as dire as the situation is becoming, we believe that Mcdonald's can turn its operation around by changing its business model and strategy to better accommodate the market and consumers.

AHS-P4-4. How The Pandemic Has Affected Christmas in the UK

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ABSTRACT
Christmas is the day in which many religious people commemorate the birth of Jesus Christ. Traditionally speaking, many celebrate Christmas by giving gifts and spending time with their loved ones. On average, British consumers spend at least 500 pounds on Christmas presents. But during 2020, companies felt the financial impact of the pandemic, where most consumers spent only 400 pounds, some regions even as low as 300 pounds. In a survey conducted, approximately 39 percent of respondents felt worried about their financial situation during Christmas. These findings suggest that while Christmas is a joyful season, it can also be a time of financial stress, and the pandemic only hardened the decisions that consumers had to make. We will compare 2019 sales to 2020 sales to analyze how the pandemic has affected not only companies profits but consumers spending habits as well.

AHS-P4-5. Picking the World's Next Best Wine – The Descriptive Determinants of Excellent Wine

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ABSTRACT
Fourteen times per year roughly one million consumers flock to read the newest issue of Wine Mag (one of the most widely regarded wine magazines in the world) to discover the highest rated wines in the ever-growing $417.8 billion industry. What are the characteristics that could potentially predict the next highest rated bottle of wine?
Over 3.8 million Qualitative data points from Wine Mag were used to analyze what the typical qualities of excellent wine are. An analysis of the wine's country, province, variety, price, and manufacturing winery were analyzed in this study.
Per the analysis, an excellent bottle of wine (95 – 100 points out of 100) is most likely to have the following characteristics: it's from the United States, specifically California, its median cost is $110.50, it's blend is a Pinot Noir, and Williams Selyem is the winery that produced it. The implications of this research is multifaceted in that it could be used to educate investors in the wine industry on where to focus investments in geographically, or to simply help consumers choose a wine that is likely to be highly rated without having to do extensive research.

AHS-P4-6. Second Ground Zero: The Impact of the Early Stages of COVID-19 on Italy, and its Future Mitigation

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ABSTRACT
When COVID-19 was first discovered, the extent of its possible impact was still unknown. Unfortunately, Italy was one of the first major countries to suffer from the effects of COVID-19. At the time, there was no accessible testing, standard protocol, or vaccines. Upon easing initial restrictions, Italy was faced with a second wave. However, once protocols were re-introduced, the spread was mitigated again. Italy is a visual case in understanding the extent of the impact COVID-19 can have, as well as providing an understanding of the importance of accessible testing, standard protocol, and vaccines as it relates to the mitigation of the effects of COVID-19. By viewing Italy's COVID-19 case statistics, it can be concluded that it is possible to mitigate the spread of COVID-19 and control its effects on major countries.

AHS-P4-7. Concerts vs. Festivals in the UK

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ABSTRACT
Music is a phenomenon that brings the world together. Listeners set their differences aside and connect through the world of music. The United Kingdom has played an immense role in the growth and development of music and live performances. The first concert was held in London in 1672, and the first festival was held in 1968. This was the beginning of the launch of live music in the United Kingdom and all around the world. It is hard to decipher if concerts or festivals are more popular by attendance because concerts are held by artists year-round, while festivals are more seasonal. However, the growth of attendance can provide information on which form of live music is growing at the fastest rate in the United Kingdom. The data studied shows that both concert and festival attendance increased greatly from 2012 to 2019. In 2020, the Coronavirus pandemic put a halt on concerts and festivals, resulting in an 85% revenue loss for the live music industry. In June 2021, the first live music event after the pandemic was the Download Festival in England, allowing 10,000 attendees. This was a tenth of what was allowed prior to the pandemic. The live music industry is still recovering from the loss caused by the pandemic, however, now that more live music events are occurring again, people will have a desire to experience what life felt like before the pandemic. It will take time to reestablish the industry, but from the data gathered before the pandemic, concert and festival attendance is going to continue to grow.

AHS-P4-8. The Uniqueness of Japan's Love for Vending Machines

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ABSTRACT
Japan is widely known for their advancement in technology. One main use of technology in Japan is the frequent use of vending machines. They have a vending machine for just about anything, from the normal food and beverage to cigarettes and alcohol. In this research, there will be a further analysis of the many types of vending machines that are available in Japan. Specifically focusing on the vending machines that sell beyond the normal food and beverage. The main point will be to provide further detailed data for the uniqueness of usage of vending machines in japan.

AHS-P5-1. Entrepreneurship and the Fight Against Poverty in the Philippines

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Khashi Khorrami[1]
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ABSTRACT
Poverty is a global phenomenon characterized by people who live on US$1.25 daily. The universal call to action to end poverty is the foundation of the development agenda both nationally and globally. In accordance with the worldwide commitment toward the Sustainable Development Goals, the Philippine government has established the Philippine Development Plan that aims to build a stronger foundation for inclusive growth and by improving trade policies to stimulate a globally competitive knowledge economy. The Philippine government has to consider the critical dynamics in poverty in public policy and as well as expand the limitations of its assessments. Since the measurement of poverty can only be determined ex post, public interventions are only directed at those who are identified as poor. The vulnerability to poverty pertains to the risk to future poverty, thus trapping them in a cycle that diminishes capital from one generation to another. This study involves previous research that include estimates of vulnerability level of households to income poverty sourced from the Family Income and Expenditure Survey, as well as the Philippines' official poverty lines. Several interventions have been established to alleviate poverty, such as the conditional money transfer, foreign aid, and as well as entrepreneurship. That so, results have indicated that entrepreneurship is effective in increasing the probability of alleviating poverty, thereby remaining above the impoverished threshold. The study makes a case on the Philippine government's implication on creating income stabilization schemes to address poverty, and to come up with differentiated proposals for those highly vulnerable.

AHS-P5-2. Working Long Hours in Indonesia Does Not Result in Economic Progress

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ABSTRACT
The average Indonesian labor workers earn lower in terms of the hourly rate, thus forcing them to work longer hours to cover their daily financial needs, but how is this correlating to the country's economic progress as a whole?
Data are collected from the year 2017 by comparing Indonesia's Annual working hours vs. GDP per capita chart as well as the Annual working hours vs. Labor productivity chart to other countries. Richer countries tend to have fewer working hours but higher wage rates as well as higher productivity. The annual working hours per worker in Indonesia is 2,024 hours while their GDP per Capita was at $10,594.07 in comparison to Japan, a richer country in ASIA with annual working hours per worker of 1,738 hours while their GDP per Capita was at $40,373.75 which is 4 times higher in terms of GDP.
The economic progress of a country does not solely depend on long working hours, it does have a lot to do with resources and the ability to increase their life quality but workers in poorer countries barely have time to improve themselves in terms of skills, knowledge, or just in terms of their general health both mentally and physically. Workers who already worked long hours barely have time to invest in themselves, thus placing them in a loophole."

AHS-P5-3. Costa Rica's Quest for Global Renewable Energy

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ABSTRACT

Global leaders understand that Earth cannot survive if we continue to use fossil fuels for energy use, yet renewables make up of just 26.2 percent of global electricity generation as of 2018. The United States and Europe have made contributions to global renewable energy use but haven't made the leap that Latin American countries are willing to take. Primarily in Costa Rica, according to the country's National Center for Energy Control, Costa Rica has been running on more than 98 percent renewable energy since 2014. Most of this energy, 67.5 percent, comes from hydropower. Additionally, wind power generates 17 percent, geothermal sources make up 13.5 percent and biomass and solar panels comprise 0.84 percent. Results show that Costa Rica has proven that their country can run solely on renewable energy for up to 300 days, as they proved this in 2017 where they set a world record. Due to Costa Rica's plan to fully ban fossil fuels, deforestation has been successfully revered in the nation. Because of this, Costa Rica capitalized economically by enacting the Costa Rican Electricity Institute (ICE) and began selling its energy surplus to Central America's Regional Electricity Market in 2015. The electricity helps power Guatemala, Nicaragua, Panama, Honduras, and El Salvador. By 2019, Costa Rica has earned more than $180 million in sales of surplus energy. We conclude that Costa Rica is leading the forefront in green energy while maximizing their profits to sell to poorer countries to solidify their status as a Latin American powerhouse.

AHS-P5-4. A Comparison of Eating Behaviors

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ABSTRACT
How do eating behaviors differ in Japan, in comparison to the United States? How is it deemed healthier? Eating behaviors and diet has become an important factor due to the increasing statistics of obesity in America. Japan, known for its unique style of eating, and has shown the cultural basis of its standpoint on food, which has diverted its culture away from the adverse health effects that the U.S is known for. With the focus on the comparison of the U.S larger portion size to traditional Japanese meal size, there is an overall large effect on health and wellness. The Japanese traditional diet of washoku emphasizes the use of seasonal ingredients. It characterizes the importance of the food dishes being in harmony with nature and the nutritional needs of the human body. The American diet is usually meat, eggs, and dairy with a high emphasis on sugar consumption. Washoku emphasizes the elements of Cultural differences, and how tradition is emphasized in Japanese meals. Our research will use the following datasets: Self-assessment of health of diet among U.S. shoppers in 2015, Distribution of diets followed by consumers in the United States in 2018 in 2019, Leading food-related habits in Japan as of 2020, Most popular food trends in Japan as of November 2020 and The Role of the Japanese Traditional Diet in Healthy and Sustainable Dietary Patterns around the World. These datasets will guide through examining primary differences on the basis of nutrition, portion size, and cultural differences.

AHS-P5-5. India: COVID-19

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ABSTRACT
India is the second-most populated country in the world. Its imports and exports reach far across the globe and influence many countries. Last year, India was struck by COVID-19 and suffered greatly in several of the country's leading international aspects. We believe that in order to grasp the impact of COVID-19 on a large population, we need to take a deeper look into India as one of the most densely populated nations in the world. Specifically, we want to research India's population fluctuations, trade patterns, financial resources, and societal effects on the people. Our research came from peer-reviewed sources, credible media sources, and direct publications from the Indian government. With our research, we understood the impacts of COVID-19 on India and how the most heavily populated nation in the world changed after the global pandemic. This research significantly impacts recovering nations as we describe how a nation in the top 10% in the world suffered and how permanent changes can be drawn from this research to develop a strategy that minimizes further damages from COVID-19.

AHS-P6-1. Examining the Factor Structure of the Trait Meta-Mood Scale While Accounting for Data Point Censoring

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ABSTRACT

Meta-mood experience refers to thoughts and feelings that serve to monitor, evaluate, and at times change mood. The Trait Meta-Mood Scale (TMMS) was designed to gauge meta-mood experience along three factors: Attention, Clarity, and Repair. Previous factor analyses have verified this three-factor structure. However, one study by Palmer and colleagues found strong support for a four-factor structure. In light of this discrepancy, the present study aimed to replicate Palmer and colleagues' study in a new sample, comparing the models they used and determining which is best-fitting. We also aimed to correct the effect of data point censoring when estimating factor models. Data censoring occurs when researchers only have partial information about the value of a variable. 202 college undergraduates completed the TMMS during an online study. To compare the models, we relied on Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC). Results revealed that the four-factor model fit the data better than the three- and one-factor models tested. The first three factors corresponded to the previous Attention, Clarity, and Repair factors. The fourth factor was named Emotional Resilience because the items loading on this factor suggested resistance to negative emotional experiences. We suggest TMMS users calculate scale scores based on all four of these factors to provide a more detailed description of meta-mood experience. Limitations of the present study include the lack of absolute fit measures for the models tested. Future researchers should use other statistical programs to replicate (or extend) our study.

AHS-P6-2. Moving beyond Trauma-Informed Approaches to Understanding Social Suffering In and Because of Schools

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ABSTRACT
Social suffering impacts students' who are from underprivileged backgrounds. The traumas associated with students who are experiencing struggles at home are very prevalent in society, but many educators aren't prepared to understand and address these students' issues. Due to this, it is commonplace that schools can potentially inflict additional traumas in their students' educational experience. Further research and proper implementation of trauma-informed practices can best assist both students and instructors, as well as the institutions that create these environments on how to address social suffering in and because of schools.

AHS-P6-3. Resilience in the BIPOC Community: A Systematic Review

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ABSTRACT
The present study is a systematic literature review on the psychology of resilience, or the ability to bounce back after a difficult situation. Although resilience is a timely and relevant variable in social psychology, little is known about its connection to the racism-related experiences of Black, Indigenous, and People of Color (BIPOC). This review explores how resilience manifests in the BIPOC community and its influence on the identity of minority groups. Previous research has shown that BIPOC reports higher resilience; however, there is still uncertainty around its connection to discrimination. Through the analysis of nine final research articles, we examined four main questions: (a) What is the prominent definition of resilience?, (b) How is resilience experienced or manifested among BIPOC?, (c) How is resilience operationalized when experiencing oppression?, and (d) What are the limitations in the literature of resilience? Results shed light on the need to further investigate resilience as a protective factor against discrimination in the BIPOC community.

AHS-P6-4. Morphology of Axon Initial Segments under Normal and Pathological Conditions

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ABSTRACT
The Axon Initial Segment (AIS) is a compartment within the neuron that plays a major role in the initiation of action potentials. Changes to AIS length and position can alter the probability of action potential firing. A majority of modeling studies consider the AIS to have linear morphology; however, we have observed different AIS shapes in different pathological conditions. The objective of this research is to classify AISs by shape (straight, curved, or kinked) and to determine the frequency of each shape across normal and pathological conditions. We stained AISs in cortical tissue using immunohistochemistry and imaged them with a confocal microscope. After imaging, we qualitatively categorized AISs in normal and pathological samples based on their shape and plotted them in ImageJ to obtain numerical data (Cartesian coordinates). We have compared AISs in cortical tissue from wild type mice to those from the Mecp2+/- model of Rett syndrome. We plan to use the Cartesian data to develop a model that describes the linear and non-linear morphologies of the AIS. Although previous research has demonstrated that position, composition, and length of AISs helps determine neuronal excitability, the relationship between AIS shape and pathology has not been examined. The current study helps establish AIS morphology as a possible pathological feature that may have functional consequences, and future experiments will investigate a relationship between AIS shape and neuronal excitability. Additional research may help to gain a deeper understanding of normal and pathological development and may lead to the development of new treatments.

AHS-P6-5. Frequency of Each Sex Affected by Sudden Unexplained Deaths due to Developmental Epilepsy

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ABSTRACT

Developmental epilepsy is a group of neurodevelopmental disorders that is mainly characterized by the onset of different types of seizures, developmental delays, and electroencephalogram (EEG) changes at a young age. Because it can describe a variety of syndromes, symptoms and specific causes may vary between affected individuals. Previous research has examined sex differences within affected adult populations but research examining sex differences for developmental epilepsy is lacking.

The objective of this research is to determine the frequency of each sex within a population of mice that died prematurely from developmental epilepsy due to mutations of the GABAA receptor α2 subunit.

To determine the frequency of each sex, we extracted DNA from the tails of pups that died prematurely. We determined their sex by running PCR to amplify the sex-determining region on the Y chromosome (SRY). PCR products were separated by agarose gel electrophoresis. Males are identified by the presence of two bands of 300 and 350 base pairs (bp) while females are identified by one single band of 350 bp.

Current research provides evidence that males are at higher risk for sudden unexplained death in epilepsy (SUDEP). The current study aims to examine whether males are at higher risk in our model of developmental epilepsy. Future research can provide additional insight into the mechanisms that lead to differences in SUDEP risk.

AHS-P6-6. Solitary Confinement and Criminogenic Attitudes: Is Isolation Reinforcing Pro-Criminal Thoughts, Feelings, and Beliefs?

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ABSTRACT

Documented increases of problematic symptomatology following exposure to social exclusion contexts may be suggestive of increases in antisocial cognition and pro-criminal attitudes among prisoners. An exacerbation in behavioral indicators of criminality in correctional populations including aggressive behavior, reduced cooperation, and deficits in impulse control may suggest that restrictive and exclusionary correctional practices can aggravate criminogenic thoughts, feelings, or beliefs. Existing literature indicates that an endorsement of pro-criminal attitudes is one of the greatest predictors of future criminal behavior.

The study will recruit 400 randomly selected female adult inmates from Florence McClure Women's Correctional Facility of Las Vegas, Nevada. A hard copy of self-report survey will be given to the participants and is expected to take 1 hour to complete. After informed consent, participants will be asked to complete a survey regarding their demographics, confinement, and pro-criminal attitudes. Participants will be surveyed at the beginning of the study, and approximately 1 week after they are released from segregation. At least one participant from the initial sample who approximately matches the demographics of the participant who is exiting segregation will also be surveyed at the same time as part of a control group.

The primary goal of this study is to demonstrate the negative effects of solitary confinement. The secondary goal is to impact policy in correctional institutions. This study aims to understand whether being placed in solitary confinement can affect pro-criminal attitudes. This research will become a strong premise to the argument of abolishing solitary confinement.

AHS-P6-7. The Effects of Altered GABAergic Signaling in Microglia on Hippocampal-cortical Network Activity and Remote Recall

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ABSTRACT
Memory acquisition and encoding are modulated by neural network activity between the hippocampus (HPC) and prefrontal cortex (PFC). Research has shown that neuroimmune defense cells, glia, interact with neurons in both brain regions. However, little is known about glial-neuronal interactions, and how these interactions affect memory network activity and in turn, memory recall. Memory network activity involves a host of cellular excitation and inhibition. The primary neurotransmitter involved in inhibition is γ-aminobutyric acid (GABA), and receptors for this neurotransmitter can also be found on microglia. To better understand glial-neuronal interactions between the HPC and PFC, we utilized a mouse model (GABABFlox) with a knockdown of GABAB receptors on microglia, to alter microglial activity. Our lab utilizes electrophysiological recordings of neuronal activity related to learning and memory in the HPC and PFC. Mice were implanted with 64-channel implants to record from single cells and local field potentials (LFPs) while completing a conditioned place preference task to measure remote recall. Results showed that GABABFlox mice had remote recall (18days) deficits but intact recent recall (1day). We also found that GABABFlox mice had changes in multiple electrophysiological signals associated with memory processing, including: decreased gamma power in the HPC, impairments in theta-gamma comodulation in the cortex, theta and delta hypersynchrony between the HPC and cortex, and fewer sharp-wave ripples in the HPC. These findings suggest that GABAergic signaling on microglia may facilitate neural network systems involved in memory formation and recall, and that alterations in microglia may impair functions necessary for memory formation.

AHS-P7-1. Queering the Narrative: A Review of Interpersonal and Structural Vulnerabilities Faced by Transgender Americans

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ABSTRACT
Transgender and Gender Expansive (TGE) Americans face immense structural vulnerabilities, including difficulties in employment, legal protection, and equitable healthcare accessibility. TGE individuals also experience interpersonal violence through verbal or physical harassment, discrimination, hate crimes, and sexual assault.[1,2] Further, race and gender coalesce to create intersecting identities; for example, TGE women of color are the most at-risk group regarding socioeconomic status, immigration, incarceration and education.[3,4] The TGE population also suffers from a shorter life expectancy ($\bar{x}$=28.2 years)[5] compared to the average U.S. life expectancy (78.9 years).[6] Unfortunately, the lack of standardized data collection prevents comprehensive analyses of the effects of structural and interpersonal violence on the TGE community.[4] To catalyze a more thorough understanding of this topic, a literature review was conducted to analyze key themes surrounding TGE lives. Studies from the last 10 years were collected using the keywords "structural vulnerability," "interpersonal violence," and "transgender." Twenty-two sources were reviewed in which 7 referenced structural vulnerabilities, 6 interpersonal violence, and 9 both factors; all included transgender identities. Four representative case studies were then chosen to illustrate the thematic findings and prevalence of violence.[5] This literature suggests that structural vulnerabilities and violence put TGE individuals at disproportionate risks of lethal violence. Americans should diligently invest in re-education programs, representative legality, and gender-inclusive healthcare. As social justice movements usher global momentum, a standardized database of deceased TGE individuals and appropriate gender identification in the U.S. census must be adapted.

AHS-P7-2. Disability and Impairment of the Hand: Trauma Analysis of the Erie County Poorhouse Cemetery

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ABSTRACT
Hands are one of the most frequently used parts of the body and, as such, are historically and intrinsically linked to daily functioning and the ability to work. Thus, the bioarchaeological analysis of hand bones can prove to be a useful resource in evaluating the lived experiences of past peoples. The current study analyzes antemortem hand trauma observed in individuals exhumed from the Erie County Poorhouse Cemetery (1851-1913), located in Buffalo, New York. In doing so we investigate patterns of trauma distribution and subsequent severity of impairment of the hand. These impairments are then used as a window into the occupational realities of the institutionalized poor in an Industrial Revolution era urban setting. Of the 271 individuals with observable hand bones, 42 (15.5%) displayed trauma in the form of a bone fracture, avulsion fracture, or joint dislocation. There were 55 females and 109 males, of which 5 (9%) and 24 (22%), respectively, displayed trauma. This was a statistically significant difference in trauma occurrences ($X2 (1) = 4.197$, $p = .040$). These findings likely reflect occupational differences between men and women. When comparing hand trauma by side (e.g., left and right hand), a significant difference was found with more trauma on the right ($t = -1.972$; $p = 0.049$). Impairment scoring of the injuries revealed that individuals suffered mild impairment and subsequent disability of their hand(s). These impairments may be indicative of the hazardous, often unregulated workplace conditions of the time as well as potential instances of interpersonal violence.

AHS-P7-5. Telecommuting The Future Towards Better Air Quality: A Case Study of India

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ABSTRACT
This study aims to answer the question on whether telecommuting offers a plausible and desirable solution to mitigating air pollution in India's largest cities by looking at the causes of air pollution, its change during the pandemic, and how popular a remote work option is among India's educated class. With a burgeoning population of over 1.3 billion people and accompanying growth in their services sectors, remote work has already been on the rise within the country and there are promising projections for its growth. Current research on the improved environmental quality during the pandemic largely focuses on the shut-down of the industrial sector with little attention paid to the impact traffic congestion has on impairing air quality. This paper finds that lessening traffic congestion in India's cities leads to better air quality but may not be the most popular among workers and has overall significance for the health and safety of India's citizenry if policies are utilized to promote remote work.

AHS-P7-6. How a Well-Functioning Federal Public-Option Health Insurance Program Could Bolster Capitalism & the Free Market

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ABSTRACT
To submit a research paper that shows how a well-functioning public-option healthcare plan can increase economic output, raise GDP, and increase the life expectancy of the average American. A thorough review will be done looking at economic & social factors that a functioning, non-price gouging, and non-profit health insurance plan that is open to all American citizens can have deep positive effects on total productivity, wages, capital expenditures on meaningful investments by both firms & people, as well as juxtaposing the current system with one that is possible to achieve.

AHS-P7-7. It's a Bird! It's a Plane! No, It's a Feminist! Analyzing the Representation of Women in Comic Book Media

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ABSTRACT
Superhero media is a 27 billion dollar industry. Superhero media has played a significant role in contemporary pop culture and society. So, where does feminist thought – or the lack of feminist thought – belong in the conversation of comics? My research aims to pinpoint and define sexist tropes within comic book media, how they can be detrimental to the representation of women, and what viewers and creators alike can do to diminish this unsatisfactory treatment. My research uses textual analysis to examine the representations of female comic book characters across various mediums. The pathway to improvement is within the promise that audiences and comic book media creators continue to educate themselves on the inherent sexist themes of female comic book media characters; new media is created that shields itself from the typical misogynistic tropes that these characters have been subject to in the past, and comic book worlds fans do the work that it takes to show that these changes are not only appreciated but that they are in high enough demand to make them the new normal. The sexist injustices in comic book media need first to be acknowledged and then removed. Female comic book characters are free to be just as heroic and empowering or as daunting and frightening as their male counterparts.

AHS-P7-8. Teachers' Experience with Lack of Resources in Classrooms

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ABSTRACT
Teachers that are working in Nevada are experiencing problems with insufficient materials. The overall purpose of this study is to provide information about their struggles with materials in the Clark County School District. What are teachers' experiences with shortages of resources, and how does it impact their teaching strategies? Teachers' experiences are important to note. Their experiences matter in finding the problems they face is essential to aid them with suitable materials. Finding solutions to their needs will improve their teaching strategies and personal spending, but children will also get the proper materials they deserve. The selection was composed of three different teachers from three different schools within the Clark County School District. This study generates a qualitative understanding of teachers' experiences. Most teachers explained the different levels of frustration with the administration and the lack of resources they experienced. Analysis shows that this increases stress levels, personal spending, and teacher attrition. These methods and responses should help the administration improve the school system and express their employee's concerns to decision-makers to receive the proper and necessary resources. Certain limitations to this study are important to note, but the overall evidence proves that these problems negatively impact teachers' experiences.

OREO-1. Analysis of Supersonic Parachutes

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Ojas Kadam
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ABSTRACT
Supersonic parachutes are entities that decrease the speed of reentry rocket capsules from supersonic to subsonic speed. Deceleration is an important aspect of re-entry, whether on earth or on other planets. Capsules, with a weight of 2400 kg, reach a speed of more than Mach 2 with less than 62 miles (ca. 100 km) of deceleration length. This puts greater emphasis on the importance of a parachute system that effectively accomplishes a safe landing. Currently, parachutes use nylon and fiber material for landing, however, little research has been conducted on the effectiveness of these materials. Experimental factors like max load, material used, stability, and sustainability are all factors that scale the effectiveness of a parachute design. Through the use of CFD and FSI simulations, as well as physical data collected from experiments, an optimal parachute design will be tested.

OREO-2. The Effects of Hypothalamic Stem Cell Degradation on Systemic Aging

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ABSTRACT

Many aspects of human biological degradation have been attributed to the continual loss of stem cells throughout the course of an organism's life. One specific aspect is the underlying disease that is aging. Through the depletion of Sox-2-expressing hypothalamic stem cells (htNSCs), it has been correlated that the decrease of htNSCs results in loss of physiological, and biochemical function in mice specifically. The deductions stated throughout are through the compilation of studies across aspects like htNSC senescence, exosomal neural miRNA production, and protein-associated biological aging. As htNSCs produce exosomal miRNAs including CD81 and lncRNA Hnscr, neural function exhibited in mice has been found to be about 75% less effective in older populations (18 months of age in comparison to 3 months of age) producing fewer miRNA systems. Additionally, the YB-1 protein identified in mice (and humans) has been found to play a key role in the activation of cellular senescence in htNSCs, which through a decrease in specifically the lncRNA Hnscr, results in the compounding effects of systemic aging. These studies suggest that all together, a lack of htNSCs results in a lack of protein and exosomal miRNA systems in mice that aid in maintaining cellular stability. Since mice and humans seem to exhibit similar homology in regards to neural microbiology, it may be possible to reverse the effects of aging in humans through supplemental miRNA and Hnscr systems in vitro, as was done in mice, to further implement these studies in the future.

OREO-3. Potential Effectiveness of Bacterial and Plant Bioremediation at Restoring Heavy Metal Polluted Soil

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Nicole Jensen
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ABSTRACT
Heavy metal pollution in soil affects not only human health and agriculture but also plant growth, plant genetics, and microbial communities. Solutions such as bioremediation have been proposed, entailing the introduction of microorganisms and plants that can break down pollutants. This study will analyze a variety of peer-reviewed academic journals to assess the viability of using bioremediation to combat heavy metal pollution. In situ bioremediation techniques have proven more effective than ex situ techniques or bioreactors (Vidali, 2001). This study specifically covers two types of in situ bioremediation: microbial and plant bioremediation. The effectiveness of using different bioremediation techniques will be evaluated in terms of adverse effects on the microbial ecosystem within the soil, the time taken to decontaminate the soil, and other factors that should be considered.

OREO-9. The Impact of Mask Wearing Upon The Epidemiological Transmission Dynamics of COVID-19 in Nevada Public Schools

Iris Cong[1]
Shayaan Zaidi
Nicole Whan
Brittny Mikhaiel[2]
Faculty Mentor: Levent Atici, Ph.D.[2]
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ABSTRACT
COVID-19 is an infectious disease which is caused by the coronavirus SARS-CoV-2, which likely mutated from infecting animals to infecting humans. The first case was reported in December 2019, leading to the outbreak of the COVID-19 pandemic. The effectiveness of facial coverings in preventing the spread of the virus has been consistently questioned by the public. Along with a lack of full knowledge concerning epidemiological transmission of COVID-19, students becoming infected by the virus is a new concern for youth in school. The primary goal of the study is to synthesize known information about general mask effectiveness in regards to COVID-19 transmission dynamics in public schools with local student statistics concerning the spread of COVID-19 in Nevada public schools. This is done in an effort to both explain the rise in COVID-19 transmission across Nevada public schools and to address the importance of mask wearing in these schools as a means of combating the increased spread of COVID-19.

HNSE-L1-1. Validation of Sweat Rate, Fluid Loss, and Sodium Loss in Wearable Technology

Macy Helm[1]
Bryson Carrier[1]
Faculty Mentor: James Navalta, Ph.D.[1]
[1]School of Integrated Health Sciences, Department of Kinesiology and Nutrition Sciences

ABSTRACT
Sweat rate, fluid loss, and sodium loss directly impact performance during prolonged exercise bouts. The Gatorade Gx Sweat Patch (Gx SP) is a wearable device that tracks these metrics in the user. Having this information allows athletes to strategize their fluid and electrolyte consumption. This randomized and counterbalanced study will determine the validity and accuracy of the Gx SP's prediction of sweat rate, fluid loss, and sodium loss compared to lab-based measurements. Healthy runners and basketball players will be recruited to participate in two running sessions on a treadmill. Participants will be asked to run at low-intensity and moderate-intensity, determined by heart rate reserve. Hydration status and sodium loss will be determined pre-and post-exercise via body weight, bioelectric impedance analysis (BIA), and urine and blood samples. While running, the participant will wear the Gx SP, an additional absorbent gauze pad, and a heart rate (HR) monitor. Running intensity will be monitored by HR and corresponding HRR values. After completing the exercise, sweat rate, fluid loss, and sodium loss will be generated via the Gx SP. The absorbent gauze will be analyzed for sodium loss. Body weight and blood and urine samples will be obtained again and compared to the pre-test samples. Participants will return within 2 to 14 days to complete the opposite running condition. To determine the validity of the device, the validation criteria for the Gx SP is: $p > 0.05$, mean absolute percentage error < 10.0%, Pearson Correlation > 0.70, and Lin's Correlation Coefficient Concordance > 0.70.

HNSE-L1-2. Analysis of High Performance Nanoparticle Based Thin Film Solid Batteries

Anayeli Flores-Garibay[1]
Faculty Mentor: Biswajit Das, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Electrical and Computer Engineering

ABSTRACT
In recent years, the production of lithium batteries has increased because of the recent push to move away from the use of fossil fuels. Despite this increase in lithium battery technology there are some major drawbacks. For instance, liquid electrolyte lithium-ion batteries can present a potential risk of fire hazard if damaged or handled improperly and are known to be toxic causing a potential risk to the environment and water supply. To overcome these problems, there has been an increase on the research and production of fully solid-state batteries. Solid state batteries are known to have longer life cycles, wider operational temperature ranges and present no threat of fire hazard because of the absence of flammable fluids. An important type of solid-state battery is the thin-film solid state battery (TFSSB) which is commonly used in Internet of Things (IoT), wearable sensors, devices, and implants. In this project we conduct a literature review to analyze the best thin film materials for the anode, cathode, and electrolyte layers for use with nanoparticle technology developed at the Nevada Nanotechnology Center at UNLV.

HNSE-L1-3. Development of a Mobile App for Project Management and Presentation

Jiaqi Li[1]
Faculty Mentor: Jorge Cacho Fonseca, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Computer Science

ABSTRACT
There is much information about research projects in the Economic Department. However, managing projects with different sizes is not easy. To solve this issue, we create a "showcase" app that has a functional database and user-friendly interface. It is very efficient and convenient. Users can extract information from the projects with filters. We use Unity platform to create the "showcase" app and SQL database to store and manage the data. Authorized users can edit, add, and delete the information of their projects in the app. The database is safe and protected. All of the information could be updated and shared among the users immediately. The app also has a rating system that helps us make future improvements.

HNSE-L1-4. Effects of Recycled Asphalt Binder on the Viscosity of Recycled Asphalt Binder and Mixtures

Abdulrahman Alahdal[1]
Faculty Mentor: Moses Karakouzian, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Civil and Environmental Engineering and Construction

ABSTRACT

Asphalt pavement is a combination of materials that are typically used in the construction of roads, highways, airports, parking lots, etc. Asphalt pavement consists of asphalt binder, mineral filler, and a mixture of aggregates such as crushed rocks, sand, slags, and gravel. These components are produced with a great deal of energy which results in significant CO2 emissions. In this study, the viscosity of virgin and reclaimed asphalt binders, as well as reclaimed asphalt binders and virgin asphalt binders' mixtures, are examined according to the testing protocol and specifications of the American Association of State Highway and Transportation Officials (AASHTO). Results from this study will allow reclaimed asphalt to be used in asphalt mixtures to the greatest extent possible. Carbon dioxide (CO2) emissions directly increase as asphalt production grows. As a result of studying the effects, we will be able to increase the proportion of reclaimed asphalt pavement used in new asphalt pavement mixtures, which in turn will decrease the yearly CO2 emissions. To maximize asphalt pavement's strength and resistance, it is crucial to maintain its viscosity, since asphalt binder is responsible for holding aggregate together. We found that the viscosity of the mixtures containing 5 to 30% reclaimed asphalt binder decreased linearly as the percentage of reclaimed asphalt binder increased. Despite this, specimens with 30 to 50% reclaimed asphalt binder show an increasing viscosity as the amount of reclaimed asphalt binder increases. Accordingly, reclaimed asphalt should account for approximately 5-30% of the total mix of asphalt.

HNSE-L2-1. Validation of the Garmin Fenix 6S Maximal Oxygen Consumption (VO2max) Estimate

Macy Helm[1]
Bryson Carrier[1]
Dustin W. Davis[1]
Kyle Cruz[1]
Brenna Barrios[1]
Faculty Mentor: James Navalta, Ph.D.[1]
[1]School of Integrated Health Sciences, Department of Kinesiology and Nutrition Sciences

ABSTRACT
Sweat rate, fluid loss, and sodium loss directly impact performance during prolonged exercise bouts. The Gatorade Gx Sweat Patch (Gx SP) is a wearable device that tracks these metrics in the user. Having this information allows athletes to strategize their fluid and electrolyte consumption. This randomized and counterbalanced study will determine the validity and accuracy of the Gx SP's prediction of sweat rate, fluid loss, and sodium loss compared to lab-based measurements. Healthy runners and basketball players will be recruited to participate in two running sessions on a treadmill. Participants will be asked to run at low-intensity and moderate-intensity, determined by heart rate reserve. Hydration status and sodium loss will be determined pre-and post-exercise via body weight, bioelectric impedance analysis (BIA), and urine and blood samples. While running, the participant will wear the Gx SP, an additional absorbent gauze pad, and a heart rate (HR) monitor. Running intensity will be monitored by HR and corresponding HRR values. After completing the exercise, sweat rate, fluid loss, and sodium loss will be generated via the Gx SP. The absorbent gauze will be analyzed for sodium loss. Body weight and blood and urine samples will be obtained again and compared to the pre-test samples. Participants will return within 2 to 14 days to complete the opposite running condition. To determine the validity of the device, the validation criteria for the Gx SP is: $p > 0.05$, mean absolute percentage error < 10.0%, Pearson Correlation > 0.70, and Lin's Correlation Coefficient Concordance > 0.70.

HNSE-L2-2. Augmented Reality Indoor Navigation

Ilya Pivavaruk[1]
Faculty Mentor: Jorge Fonseca Cacho, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Computer Science

ABSTRACT
Augmented reality has been on the rise in popularity within the computer science field. It is used for displaying virtual objects in reality through devices' cameras. Indoor navigation has been a subject for experimentation with the use of augmented reality but it has been heavily reliant on various beacon systems to keep track of the user in virtual space. We decided to attempt to create an augmented reality application that would fulfill the role of indoor navigation without the need for any external hardware. We used Unity and AR Foundation to create an application that would use optical character recognition on nameplates and micro-adjustments to locate and guide the user to their destination. The testing is currently being done by asking students to use the app to reach certain destinations. Once they are done they record their experiences with the app. This application is made by experimentation of different approaches to indoor navigation. Hopefully, the research that we've done and the innovative ideas we put into this application can help advance the field of augmented reality and indoor navigation.

HNSE-L2-3. Post-zygotic Reproductive Isolating Barriers Contributing to Metrosideros (Myrtaceae) Divergence

Jaclyn Martinez[1]
Faculty Mentor: Elizabeth Stacy, Ph.D.[1]
[1]College of Sciences, Department of Life Sciences

ABSTRACT
On the Hawaiian Islands, Metrosideros (Myrtaceae) is a landscape-dominant woody species complex that includes a surprising number of interfertile varieties, races and species. These many taxa appear to represent ongoing population divergence and speciation, in which we suggest there may be postzygotic reproductive barriers relating to hybrid incompatibilities that contribute to speciation. This project examines rates of embryo development and seed germination as indicators of postzygotic isolating barriers in Hawaiian Metrosideros. We optimized laboratory methods for each measure and applied them to examine preserved seeds of pure-taxon crosses and hybrid crosses (i.e., crosses between taxa or involving F1 hybrids). After batches of seeds from both cross types are imported and rehydrated, the proportion of developed embryos is recorded under a dissecting scope. Seeds are then germinated on filter paper in a petri dish, watered and sealed with parafilm, and placed under full spectrum LED light. The proportion of seeds germinated (i.e., standing plants with two leaves) is recorded every two weeks for six weeks. This project seeks to provide insight into the role of early life-history stages in the evolution of reproductive isolating barriers in a hyper diverse, hybridizing tree species complex.

HNSE-L2-4. COVID-19 Vaccine Hesitancy in the United States: Evidence in Late 2021

Ambree Schoetker[1]
Faculty Mentor: Manoj Sharma, Ph.D.[1]
[1]School of Public Health, Department of Environmental and Occupational Health

ABSTRACT

The coronavirus disease, COVID-19, has changed daily life dramatically since early 2020. Although COVID-19 vaccines are available in the United States, many express distrust in this primary prevention public health measure and doubt as to the seriousness of COVID-19 and associated morbidity and mortality. Vaccine hesitancy, also described as the reluctance or refusal of vaccines despite availability, exists on a continuum and was a known public health threat prior to the coronavirus pandemic. This narrative review examines studies related to the determinants of COVID-19 vaccine hesitancy among adults in the United States. Also explored are the factors related to COVID-19 vaccine risk communication and available interventions to address COVID-19. Perceived severity of and susceptibility to COVID-19, trust in public health authorities and government in general, educational attainment, income, race, and sex were found to be significant determinants of vaccine hesitancy. Due to lack of available evidence-based interventions to counter COVID-19 vaccine hesitancy, peer-reviewed commentaries and other health communication principles formed the basis of additional recommendations for COVID-19 vaccine hesitancy interventions. Recommendations included trust-building efforts at the community, national, and institutional levels as well as addressing social determinants of health. The results of this narrative review may likely be limited by recent vaccine mandates related to education and to employment. Future research is needed to identify any changes in acceptance, uptake, and trust in institutions such as public health agencies and universities and representatives of those institutions.

HNSE-O1-1. Preliminary Analyses of Fatal Bicyclist Crash Characteristics in the Western US

Allyson Deijkers[1]
Faculty Mentor: Shashi Nambisan, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Civil and Environmental

ABSTRACT

This presentation summarizes preliminary analyses of some factors related to fatal bicyclist crashes. It focuses on urbanized counties in California, Nevada, Oregon, and Washington for the years 2008-2018. Key variables analyzed include state and county, crash location (at intersection, on roadway, on shoulder, etc.) and lighting conditions (day/night). The National Highway Traffic and Safety Administration's (NHTSA) Fatality Analysis Reporting System (FARS)'s data were used for the analyses. Results show commonalities and differences across the counties. In Nevada, Clark and Washoe counties had most of their crashes during daylight conditions, on the roadway. In California, results vary across the state. Yolo County had most of their crashes on the roadway, and not intersection related. San Diego County had half of their crashes under daylight conditions, on the roadway. San Francisco County had most of their crashes under daylight conditions, on the roadway, and at an intersection. Sacramento County had half of their crashes under daylight conditions, on the roadway, and not at an intersection. Los Angeles County had half of their crashes under daylight conditions, on the roadway. Multnomah County, Oregon had most of their crashes under daylight conditions, on the roadway. King County, Washington had most of their crashes under daylight conditions, on the roadway, with a slight majority at an intersection. The results indicate that other factors such as roadway and bicyclist characteristics also need to be integrated in the analyses. These will be explored next to help develop and deploy appropriate countermeasures to enhance bicyclist safety.

HNSE-O1-2. How Facial Features and Head Gesture Convey Attention in Stationary Environments

Janelle Domantay[1]
Faculty Mentor: Brendan Morris, Ph.D.[2]
[1]Howard R. Hughes College of Engineering, Department of Computer Science
[2]Howard R. Hughes College of Engineering, Department of Electrical and Computer Engineering

ABSTRACT
Awareness detection technologies have been gaining traction in a variety of enterprises; Most often used for driver fatigue detection, recent research has shifted towards using computer vision technologies to analyze user attention in stationary environments such as online classrooms. This study aims to extend previous research on distraction detection by analyzing which visual features contribute most to predicting awareness and fatigue. We utilized the open source facial analysis toolkit OpenFace in order to analyze visual data of subjects at varying levels of attentiveness. Then, using a Support Vector Machine (SVM) we created several prediction models for user attention and identified Histogram of Oriented Gradients (HOGS) to be the greatest predictor of the features we tested. We also compared the performance of this SVM to deep learning approaches that utilize Convolutional and/or Recurrent neural networks (CNN's and CRNN's). Interestingly, CRNN's did not appear to perform significantly better than their CNN counterparts. While deep learning methods definitively performed better, SVMs utilized less resources and, using certain parameters, were able to approach the performance of deep learning methods.

HNSE-O1-4. Development of Experimental Rocket for Component and Payload Acceleration Load Testing

Drew Nemeth[1]
Jake Pettitt[1]
Faculty Mentor: Brendan O'Toole, Ph.D.[1]
[1]Howard R. Hughes College of Engineering, Department of Mechanical Engineering

ABSTRACT

With a burgeoning commercial space industry in the United States, more reliable and cost effective methods for qualifying critical flight components are required in order to reduce the costs of spacecraft development programs. Electronic payloads designed to undergo high acceleration loading during military and civil rocket flight have proven especially difficult to properly flight test prior to operational use. This paper describes the design, construction, flight testing, and post-flight analysis of a single stage launch vehicle with an intended apogee of 50,000 feet and maximum velocity in excess of Mach 2 with a simulated electronic payload. Software suites including OpenRocket, RasAero, and AeroFinSim were utilized in order to confirm rocket stability, a projected flight outline, and structural integrity of the airframe and fin composition/attachment that commonly fail during supersonic flight regimes. The airframe was primarily constructed of G12 filament wound fiberglass tubing in addition to a composite fin can centered around CNC'd G10 fiberglass cores with a wet carbon fiber layup by hand. Flight roll control was achieved via the onboard reaction wheel, which was constructed of 3D printed components and inertial measurement sensors. The completed vehicle experienced a successful flight to 42,000 ft, maximum velocity of Mach 2.2, and maximum acceleration of 16 G. The airframe and all components were safely recovered and in working order post-flight. A successful test of the simulated electronic payload was performed and a low cost flight verification method was established.

HNSE-O1-5. Integrating Crash Datasets to Facilitate Traffic Safety Analyses

Jonathan Pasternack[1]
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[1]Howard R. Hughes College of Engineering, Department of Civil and Environmental Engineering and Construction

ABSTRACT

Traffic crashes are of significant concern to society. Understanding key factors related to traffic crashes is critical to develop strategies to enhance road safety. Factors include attributes related to the crashes, persons and vehicles involved, and environmental conditions. These data are based on reports and records maintained by multiple agencies at the local, state, and national levels. Unfortunately, such data are not readily available in an integrated manner. The Nevada Department of Transportation (NDOT) consolidates and captures in a digital format crash reports filed by individual law enforcement officers and their agencies. NDOT's database has separate subsets for attributes related to crashes, persons, and vehicles with a common field linking two of these three subsets. A consolidated database is required to perform the desired analyses. This presentation will summarize the steps needed to integrate the individual data subsets into one consolidated database using data obtained from NDOT for the years 2015 to 2019. It will demonstrate an automated procedure to develop the consolidated databases. Next, it will highlight the process to georeference data for individual crashes and link them to the crash attributes in a GIS environment. In addition, the presentation will touch upon challenges and issues related to integrating individual data sets and to incorporating them in a geographic information system (GIS) environment. Future work includes developing queries and conducting statistical analyses to answer hypotheses regarding similarities and differences in road safety outcomes based on spatial and temporal characteristics

HNSE-O1-6. Qualitative Analysis on Implicit Bias Against Patients of Color in Healthcare

Raisa Kabir[1]
Sayeda Tazim F. Zaida[1]
Faculty Mentor: Manoj Sharma, Ph.D.[1]
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ABSTRACT
People of color (POC) from stigmatized and marginalized communities face implicit bias in healthcare. Implicit biases are unconscious attitudes and internalized discrimination developed through repeated practices based on stereotypes from a foundation of structural discrimination. Implicit bias in clinical settings impacts an individuals' quality of care and overall health outcomes. The study aimed to characterize and address implicit bias among healthcare professionals toward POC in clinical settings. A literature search in MEDLINE/PubMed, CINAHL, and EBSCO databases was undertaken to include all peer-reviewed studies (2011-2021) about implicit bias toward POC. The original literature search located 121 peer-reviewed articles. Out of those, 20 literature articles met the inclusion criteria. Patients of color disparities are often due to the lack of access to health care/insurance, the quality of care/treatment received, and overall health outcomes. Additional factors include gender, age, mental illness, weight, disability, sexual orientation, AID status, socio-economic status, and social circumstances. Most healthcare providers appear to have an implicit bias in terms of positive attitudes toward Whites and negative attitudes toward POC. Future studies need to employ more rigorous methods to examine the relationship between implicit bias and healthcare outcomes. Interventions targeting implicit attitudes among health care professionals are needed because implicit bias may contribute to health disparities and the overall clinical care of POC. Educational initiatives, reformed policies/practices, and new research are needed. Acknowledging racial/ethnic, cultural, and religious bias in clinical settings minimizes implicit bias and reduces negative health care experiences for POC.

HNSE-O2-1. Characterization of Neuronal Protein-protein Interactions using Baits from the 15q11.2 Locus

Natnael Basazinew[1]
Nabih Ghani[1]
Ching Lan (Lanie) Chang[2]
Richard Gu[3]
Hayley Baker[1]
Moonis Ghani[1]
Van Vo, Ph.D.[2]
Faculty Mentor: Edwin Oh, Ph.D.[2]
[1]College of Sciences, Department of Life Sciences
[2]College of Sciences, Nevada Institute of Personalized Medicine
[3]College of Sciences, Department of Chemistry and Biochemistry

ABSTRACT
The 15q11.2 microdeletion syndrome results in neurodevelopmental deficits that include developmental delay and psychiatric conditions. While comprehensive microarray studies have demonstrated that four genes (NIPA1, NIPA2, CYFIP1, and TUBGCP5) within the 15q11.2 locus are associated with behavioral and anatomical pathology, a unifying hypothesis to correlate gene function to phenotype has not been established. Copy number variations within chromosome 15 are relatively frequent in approximately 1% of the population. An increasing number of genes are associated with intellectual disability (ID) and autism spectrum disorders (ASDs). Fragile X mental retardation gene 1 (FMR1), whose silencing causes the Fragile X syndrome, is the most common form of ID and autism. The precise functional significance of the CYFIP/FMRP interaction is not understood fully; however, among the interactors of FMRP, CYFIP1/2 are good candidates for ID and autism, based on their genetic implication and functional properties. CYFIP1 and CYFIP2 represent a link between Rac1, the WAVE complex, and FMRP, favoring the cross-talk between actin polymerization and translational control. Thus, the role of Cyfip1 in brain connectivity is yet to be explored. Using mass spectrometry, immunoblotting, and immunoprecipitation datasets, we will characterize protein-protein interactions and mechanisms associated with the manifestation of neural disorders linked with the 15q11.2 microdeletion syndrome, and more specifically, with CYFIP1 copy number variation.

HNSE-O2-2. Relationships During COVID-19 Pandemic: Measuring Economic, Social, and Public Health-related Consequences on Intimacy and Satisfaction

Adrianne Dizon[1]
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[1]College of Sciences, Department of Life Sciences
[2]Kirk Kerkorian School of Medicine, Department of Psychiatry

ABSTRACT
Amidst the COVID-19 pandemic, couples dealt with tremendous challenges such as financial insecurity, social seclusion, and an onset of public health restrictions. The pandemic has exacerbated many existing and novel stressors affecting couple intimacy and satisfaction. Extant literature reveals financial strain and social isolation induced by a stressful event, like a health crisis or natural disaster, influences relationship contentment; however, behaviors towards public health restrictions have not been explored. The aim of this study was to evaluate how pandemic-related stressors, namely financial strain, social isolation, and public restriction behaviors, influence relational intimacy and relationship satisfaction. The study sample (N=160) consisted of mostly college-aged females (M=25, SD= 8.66) with an average relationship length of 4.31 years (SD= 5.36). Using a multiple-regression two-dependent variable model, the contribution of each pandemic-related measure to variance level was assessed while the junction of the three stressors was associated with intimacy and satisfaction. Results indicate combined COVID-related stressors had a negative association with relational intimacy and relationship satisfaction. Social isolation contributed the most variance (15%) to the level of relational intimacy and relationship satisfaction (R2= 0.151). A comprehensive discussion on the long-term implications of social isolation on couples is provided. Additional insight is presented on how couples and family therapists provide coping strategies and interventions for distressed couples.

HNSE-O2-3. Development of a Novel Alzheimer's Therapy: Reduction of Inflammation

Aurora Emini[1]
Lorena Samentar, Ph.D.[1]
Faculty Mentor: Nora Caberoy, Ph.D.[1]
[1]College of Sciences, Department of Life Sciences

ABSTRACT
Alzheimer's disease is a progressive neurodegenerative disease affecting about 5.8M Americans and nearly 48M people worldwide. Currently, there is no cure for Alzheimer's. Available treatments only address the cognitive and behavioral symptoms but do not delay or stop the progression of the disease. One characteristic of Alzheimer's is the deposition of amyloid beta plaques in the brain. Clearance of these plaques involves receptors on the cell surface whose activation results to the release of harmful inflammatory factors. This leads to the eventual death of nerve cells. At the Caberoy Lab, we develop a novel Alzheimer's therapy through amyloid beta clearance without causing inflammation by using the hybrid protein that we have engineered. We have previously demonstrated that our hybrid facilitated amyloid beta clearance. So our main question here is, can our hybrid reduce inflammation in Alzheimer's disease? We observe a significant reduction in levels of harmful oxidative and inflammatory factors in the presence of our hybrid compared to the control. This implies that our hybrid does not only facilitate clearance of plaques but also reduce inflammation. Our promising result is very exciting as we join the race in developing a cure for Alzheimer's disease.

HNSE-O2-4. Evolutionary Analysis of NLR Genes in Metrosideros through Comparative Genomics

Sarem Khilji[1]
Jae Choi[2]
Faculty Mentor: Elizabeth Stacy, Ph.D.[1]
[1]College of Science, School of Life Sciences
[2]New York University

ABSTRACT
Plants rely heavily on innate immunity toward pathogens due to the fact that many of them do not contain specialized adaptive immune system cells. In order to mount proper immune responses, plants must come up with several broad defense mechanisms. One such mechanism in these plants, nucleotide-binding domain & leucine-rich repeat (NLR) proteins, are key players when it comes to intracellular immune-related functions. While the biological functions and protein structure of NLR genes are similar across species, variation in NLR gene numbers and sequences among closely related plant taxa can play a key role in diversification and the evolution of reproductive isolating barriers. In this study, we examine variation in NLR genes within Hawaiian Metrosideros (Myrtaceae), an incipient adaptive radiation of woody taxa that show partial isolating barriers. By using NLR annotating software tools, examining the number of NLR genes through code, mapping these genes to their respective chromosomes, and looking at synteny between taxa, we hope to glean insight into the evolution of NLRs in Metrosideros and how variation of these NLR-mediated mechanisms may potentially confer reproductive isolation within taxa. Preliminary results suggest that pubescent Metrosideros taxa may have a greater number of NLR sequences than glabrous taxa while also varying in their distribution across chromosomes. Future synteny analysis will provide a framework for examining variation of these homologous genes and help to establish if gene order is a significant factor of NLR variation among different species.

HNSE-O2-5. Testing for a Smad Requirement in Wnt Signaling in Drosphila Embryos

Samantha Giannantonio[1]
Faculty Mentor: Laurel Raftery, Ph.D.[1]
[1]College of Sciences, Department of Life Sciences

ABSTRACT
Cells communicate by producing molecular signals that activate a signal-specific pathway to elicit a response in neighboring cells. Signaling pathways share similar elements that include the signal and receptor, and intracellular components to relay the signal and effect a change in gene expression. Two signaling pathways, the Wnt pathway and the Bone Morphogenetic Protein (BMP) pathway, which contribute to the establishment of body plans for all multicellular animals, have been thought to be independent of one another. However, recent evidence suggests that the Wnt and BMP pathways share a signal transducer that has a necessary function in both pathways. This hypothesis has not yet been tested with the definitive genetic method of using a genomic deletion. This is a progress report of such a definitive test. I am testing whether Mad is required in both the BMP and Wnt signaling pathways using the Mad[KO] allele to generate Drosophila embryos that lack Mad. Whether Mad is required for Wnt responses will be determined by examining the denticle belt patterns of exoskeletons from embryos that lack Mad. The denticle belt pattern will be compared to that of embryos that lack the signals necessary for either the BMP or the Wnt pathway. The results obtained will provide critical evidence for whether Mad functions only in the BMP signaling pathway, or both BMP and Wnt signaling pathways.

HNSE-O2-6. Interrogating a Centrosomal-specific Role for DDX3X During Brain Development

Nabih Ghani[1]
Natnael Basazinew[1]
Ching Lan (Lanie) Chang[2]
Richard Gu[3]
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Van Vo, Ph.D.[2]
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[3]College of Sciences, Department of Chemistry and Biochemistry

ABSTRACT
DEAD-box proteins are RNA helicases that are characterized by a conserved Asp-Glu-Ala-Asp motif. These proteins are involved in a variety of processes within cells, ranging from cell cycle progression to the innate immune response. DDX3X is a protein-coding gene found on the X chromosome that codes for a DEAD-box RNA helicase and variants in this gene are believed to be involved in 1-3% of unexplained intellectual disabilities in females. The DDX3X protein is vital for cell viability and is found in all tissues within the body. While mutations in the human DDX3X gene have been characterized to cause intellectual disabilities, seizures, and autism, the mechanism that associates the genetic lesions to pathology is still under investigation. Here, we use mass spectrometry to characterize a complex interactome of DDX3X in the mouse brain. We also verify the novel interactions using immunoblotting techniques and show that phenotypes associated with loss of function DDX3X mutations can be explained through some centrosomal proteins identified in our screen. The data suggest that the loss of DDX3X from the centrosome can perturb neuronal development.

HNSE-O2-7. Factors Associated With Telemedicine Usage And Acceptance Pre- and Since COVID-19

Shivangi Sinha[1]
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ABSTRACT
The COVID-19 pandemic has acted as a catalyst for telemedicine uptake among both healthcare providers and patients. Prior research rarely has examined the lack of patient uptake of telemedicine. Known systemic barriers to accessing telemedicine in the U.S. before the COVID-19 pandemic may play a large role in its uptake. The purpose of this study is to assess the factors associated with the usage and acceptance of telemedicine pre- and since the COVID-19 pandemic. In this cross-sectional study, data was collected from persons residing within the U.S. who are 18 years of age or older using an online survey. Using an integrated model of the Theory of Planned Behavior and Technology Acceptance Model, this study measured barriers to accessing telemedicine before and since the COVID-19 pandemic as well as the six constructs of the model. Descriptive statistics and logistic regression were calculated. In the model examining predictors of telemedicine use before COVID-19 ($p<0.001$), racial/ethnic identity ($p<0.05$) was the statistically significant predictor. In the model examining predictors of telemedicine use since COVID-19 ($p<0.001$), devices used to access telemedicine since COVID-19 ($p<0.05$) was the statistically significant predictor. Gender identity, employment status, healthcare status and selected constructs of the integrated model were among the variables not statistically significant in either regression model. These findings contribute to the existing literature regarding barriers to telemedicine uptake among patients in the U.S. Future studies should focus on making the survey more accessible to non-English speakers and communities with limited Internet access.

HNSE-O3-1. Highly Sensitive Capacitance Measurements of 2D Materials

Justin Alvarez[1]
Kayla Cerminara[1]
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ABSTRACT
The quantum anomalous hall effect (QAHE) is a phase of matter in which a dissipationless current is made to flow around the edge of a two dimensional (2D) material. Making use of this effect for next generation electronics could lead to faster processors and low power devices. There are very few materials that exist in nature that intrinsically possess the QAHE, however by sandwiching target 2D materials together we can establish this highly sought after phase. By using three 2D materials: graphene, molybdenum disulfide (MoS2) and chromium tri-iodide (CrI3) forming a van der Waals heterostructure we can create a proximity induced magnetism effect. Here, we took highly sensitive capacitance measurements of graphene on MoS2 devices at low temperatures and high magnetic fields. By taking measurements of the penetration field capacitance vs charge density and polarization of a graphene and MoS2 device at 2 Kelvin and zero external magnetic field, we are able to see the charge neutrality point in graphene and the conduction band of MoS2. Using this method of capacitance measurements we plan to integrate thin CrI3 flakes into our graphene and MoS2 devices to develop a full device to study the proximity induced QAHE.

HNSE-O3-2. Utilizing Muscovite to Create High Mobility Molybdenum Disulfide Transistors

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ABSTRACT
Molybdenum disulfide transistor devices were fabricated utilizing muscovite mica as dielectrics in order to test the hydrophilic behavior of mica. This was done by probing the device for its transconductance plot to show hysteretic patterns. Devices were fabricated using a clean van der Waals technique to stack two-dimensional materials into heterostructures. The devices showed a hysteretic trend in the transconductance curve. We compared the hysteretic behavior from mica with that of another well-known dielectric, silicon dioxide. The devices with mica dielectrics showed larger hysteresis in the gate sweeps than silicon dioxide. Devices utilizing mica as dielectrics are expected to have hysteretic behaviors due to the interfacial water on the mica surface. It is also speculated that water accumulation will continue to grow on the surface as long as the device is in ambient conditions, so the hysteresis may worsen over time. We aim to mitigate water absorption at the surface of mica and suggest future work to accomplish this goal.

HNSE-O3-3. Do All Fast Radio Bursts Repeat?

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ABSTRACT
Fast Radio Bursts (FRBs) are bursts of radio waves detected at great distances from space. Some FRBs are observed to repeat while some others not. One important question concerning astrophysicists today is whether all FRBs repeat. Recently, the Canadian Hydrogen Intensity Mapping Experiment (CHIME) published a master catalog of FRB detections for both repeating and non-repeating FRBs. This is the largest FRB database published to date. With the data in this catalog, we investigate whether repeaters and non-repeaters may show up as statistically different categories in certain parameter space. We focus on the FRB arrival time and fluence and study the repetition behavior in the fluence ratio vs. waiting time two-dimensional space for each pair of bursts for repeating FRBs as well the lower limits of both parameters for non-repeaters. From this graph we can determine if repeaters and non-repeaters indeed occupy different phase spaces, which can shed light on whether they have distinct origins or rather form a continuum in terms of repetition rate, i.e. the apparent non-repeaters are simply repeaters with slower repetition rates.

HNSE-O3-4. Dynamics of Charged Matter With Magnetic Monopole Fields

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ABSTRACT
This project explores the dynamics of charged matter under the influence of a magnetic monopole field. Centuries of speculation has centered on the existence of magnetic monopoles. The lack of observational evidence of these particles has left us with a gap in our understanding of electromagnetism. Within Maxwell's equations, the equations that describe electricity are not symmetric to those that describe magnetism. Modern quantum theories for the fundamental constituents of matter demand that magnetic monopoles were created copiously in the early Universe. Despite many unsuccessful attempts to find evidence of their existence, efforts in that search continue. More recently, theoretical and laboratory studies have demonstrated how effective magnetic monopole structures can manifest in spin ices created in the laboratory. In this study, we explore the dynamics of charged matter in the environment of a magnetic monopole and calculate the radiation signature of that encounter. We propose that the latter serve as a diagnostic in laboratory and astrophysical searches for these elusive particles. We derive the equations of motion using conservation laws and provide analytic solutions to scattering events. We used the analytical results to verify the predictions of our numerical algorithm. We developed a robust program capable of providing accurate solutions under a wide variety of parameter settings. Our results confirm that the scattering trajectories lie on the surface of a cone, as previous studies have found under more restrictive conditions. Our approach has provided a comprehensive analysis of charged matter's motion and radiation signature in a monopole field.

HNSE-O3-5. Development of Novel Synthetic Methods of Lysine-Specific Demethylase 1(LSD1) Inhibitors as Anti-Cancer Reagents

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ABSTRACT
Cancer is the malignant growth and division of abnormal cells. The proliferation of cancerous cells is harmful to the human body since it interferes with many biological processes. Lysine-specific demethylase 1(LSD1) protein levels are expressed at high levels in many types of cancers such as teratocarcinoma, embryonic carcinoma, and embryonic stem cells. Gene expression in cancerous cells can be repressed by lysine-methylation on histones which ensures the maintenance of a tightly organized histone. Targeting LSD1 protein levels can significantly impair the growth of cancer due to the methylated histones being unable to participate in gene expression. Lysine-specific demethylase 1(LSD1) inhibitors prevent the proliferation of cancer by targeting the high concentrations of lysine-specific demethylases vital for cell proliferation. CBB3001 is a LSD1 inhibitor which has been able to inhibit the growth of cancer, warranting further investigation. The aim of this research project is to synthesize CBB3001 by developing efficient synthetic methods and to then create a CBB3001 derivatization library. The researchers involved will synthesize CBB3001, a LSD1 inhibitor, by developing several synthetic pathways with variability along specific steps to produce CBB3001 derivatives. CBB3001, and its derivatives, show great promise in functioning as anti-cancer reagents for many types of human cancers.

HNSE-O3-6. High Precision In-Situ Raman Spectroscopy on a Novel Room-Temperature Superconductor, Carbonaceous Sulfur Hydride, Under Pressure and Cryogenic Temperatures

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ABSTRACT
Superconductivity is an incredible quantum phenomenon that historically only occurred at low temperatures. Recently, room-temperature superconductivity was discovered and will have various benefits and advantages in application, such as revolutionizing the energy grid, making medical imaging more accessible, and solving problems in related sciences. We have experimentally investigated carbonaceous sulfur hydride (CSH), a novel room-temperature superconductor, at varying cryogenic temperatures and pressures through high precision Raman spectroscopy. The current understanding of the material lacks information about the chemical structure and stoichiometry. Investigating the temperature and pressure space of its Raman spectra will give insight on important details about its structure, chemical composition, and phase diagram while other investigative methods are not suitable. CSH was synthesized in a diamond anvil cell (DAC) and taken to 12 GPa at ambient temperature. Raman scattering data for CSH's vibrational spectra was collected on warm up from 10K to 293K at a pressure of 28 GPa. Various thermal broadenings, a temperature induced phase transition in the lattice mode region of the spectra, and present C-H modes at low temperatures are observed.

HNSE-P1-1. Comparison of Biochar Attained from Various Feedstocks for the Adsorption of Arsenic in Water

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ABSTRACT

Water is a fundamental human right, yet in many developing countries, it is a luxury. Water shortages and polluted water have become routine for millions of Venezuelans in the last two decades due to a failing economy and infrastructure mismanagement. According to the World Health Organization, arsenic (As) is a worldwide pollutant. Though it occurs naturally, As is toxic and may cause chronic poisoning with prolonged exposure. An estimated 4.5 million individuals in Latin America are chronically exposed to high levels of As (>50 μg/L), some up to 2000 μg/L. Biochar, a carbon-based material, effectively adsorbs and sequesters pollutants. However, the decisive argument for further investigation of this sustainable adsorbent is its production from locally available and inexpensive materials. Furthermore, due to its large surface area, biochar soaks up pollutants from water. This research evaluates the feasibility of using sustainable biochar to remove As from water. In this study, we selected various feedstocks, specifically sugarcane bagasse, peanut, and walnut shells, which are readily available biowaste in Venezuela. Each feedstock was pyrolyzed for a specific time and temperature under an inert (Ar) atmosphere to produce biochars. First, biochars were characterized using various techniques such as FTIR analysis, BET theory, SEM, and others. Then, comparative, temperature-controlled adsorption batch experiments were conducted to estimate the adsorption capacities of each biochar. Future research will focus on taking the highest As adsorbent and preparing a water filtration system that a small community could use, providing them with improved access to clean water.

HNSE-P1-3. Literature Review: Review of Recent Developments of Bioremediation Applications to Ocean Oil Spills

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ABSTRACT

This paper explores recent developments in microbial remediation, specifically oil-degrading bacteria, and its potential use in ocean oil spills. Marine oil spills are a growing issue worldwide, due to its hazardous impact on both public and environmental welfare. Conventional oil spill management practices are inefficient, since significant amounts of oil remain in the water post-treatment. A possibly efficient and environmentally friendly solution is bioremediation, also known as microbial remediation. Bioremediation is a form of microbial enhanced oil recovery (MEOR), which is a biotechnological process that utilizes microorganisms to break down organic compounds, such as oil. By use of oil degrading bacteria, bioremediation applications may prove to be a feasible method in oil spill management. In this review, a systematic approach was used to find literature that could be analyzed to find which bacterial strains and supplementations would improve bioremediation as a method for mitigating ocean oil spills. It was concluded that certain bacterial strains are effective at degrading oil, given that certain metabolic and nutrient conditions are provided. Bacterial strains capable of decontaminating marine oil spills include Mycobacterium vanbaalenii, and Alcanivorax borkumensis, and Cycloclasticus, along with several others. Algae and dispersants used in conjunction with marine bacteria enhanced oil-degradation rates. However, more studies are needed to further investigate more potential bacterial strains capable of oil-degradation, and if other supplementations oil spill recovery in oil spills.

HNSE-P1-4. The Potential Health Effects of Bacterial Use in Self-Healing Concrete: A Systematic Literature Review

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ABSTRACT

In due course, structures developed from concrete create microcracks exposing it to degradation via the reinforcement steel's formation of ferric oxide. The aforementioned declines the loading capacity and lessens durability. A corrective technique used to counteract the effects above is bio-mineralization, self-healing the crevices with microorganisms' metabolic processes. Literature has explored some specific organisms used, and the research strongly supports that the existing bacteria used positively strengthen the concrete's durability. This literature analysis examines if the selected microorganisms: Sporosarcina pasteurii, Lysinibacillus sphaericus, Bacillus cereus, and Bacillus subtilis used in some current constructional methods will harm the health of consumers or those employees that have potential contact with those elements. Until this point, those strains used in this research appear to be nonpathogenic and safe to use with appropriate biosafety standards. Urease production was of concern due to its virulence factors, but the strains revealed no pathogenic outcomes within this review. After further examination, the concern for human health focused on the biological process that generates ammonium and carbonate via the urease enzyme within these bacteria. During the procedure of self-healing concrete, there is also a concern for ammonium exposure to employees and populations that live near these production sites. Ammonia exposure can cause bronchiolar and alveolar edema, depending on the amount consumed and the duration of human exposure. Sporosarcina pasteurii, Lysinibacillus sphaericus, Bacillus cereus, and Bacillus subtilis exhibit no apparent harm to healthy humans within the analyzed studies.

HNSE-P1-5. Isolation of Salt Tolerant Bacteria and Investigation of Perchlorate Biodegradation at High Salinity Conditions

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ABSTRACT

Perchlorate (ClO4-), known as a highly soluble oxidizer contaminant, has been detected in soil and groundwater throughout the United States for the last two decades. Biological reduction has been seen as a promising technology through which perchlorate reducing bacteria (PRB) occurring naturally in most environments utilize ClO4- as an electron acceptor. However, biological reduction of perchlorate is influenced by high salinity levels because the PRBs' activity is hindered at salinities over 1%. The goal of this study is to investigate the impact of salinity (NaCl: 0-6.5%) on perchlorate biological reduction. Actual soil samples from the contaminated site containing PRBs were used and acclimated in broths with different salt concentrations and later the cultures were tested on their reduction abilities using perchlorate (150 mg/L) as an electron acceptor (450 mg/L) and acetate as an electron donor. Gram-staining results revealed that there has been consistent growth of salt tolerant bacteria observed at each salt concentration level (0-6.5%). The variety of bacteria are displayed with the diverse shapes present under the compound microscope, from Gram-positive bacilli to Gram-negative cocci. However, it is important to consider that the reduction kinetic is slow even as the perchlorate reduction has been observed at 6.5% NaCl concentration. This will be further studied as the experiment is still running to obtain more promising results regarding perchlorate reduction and salt tolerant bacteria isolation. The conclusion drawn so far is that there are salt tolerant bacteria in this soil which can degrade perchlorate at environments with high salt concentration.

HNSE-P1-6. A Review on the Usage of Machine Learning Methods Gait Analysis and Possibility of a Portable Gait Analysis Device

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ABSTRACT

Gait analysis is a valuable tool for evaluating and monitoring an individual's walking pattern, which is used to recognize movement-related irregularities. Lately, machine learning methods have been introduced in the processing of the gait analysis data to help monitor and analyze the data. Given the increased interest in the area, this paper will focus on two parts: one is analyzing and reviewing the latest Machine learning Methods and sensors used, and the second is the possibility of a portable device capable of measuring and processing an individual's gait. The analysis of the Machine learning models and sensors papers illustrated that several algorithms and methods used had shown a possibility in helping to identify and monitor neurodegenerative disease, which is an excellent area for further research. Additionally, the second part of the study showed that a portable device capable of measuring and processing an individual's gait is possible and would be capable of data processing onsite. However, that device would have a disadvantage over the conventional gait analysis.

HNSE-P1-7. Deep Learning on Field Programmable Gate Array

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ABSTRACT
Field Programmable Gate Arrays (FPGAs) are a great candidate for implementing deep learning solutions with a focus on enhanced speed and size, due to their lower latency and minimal power consumption. This research aims to further elaborate on DL on FPGA boards due to the versatile architecture of the FPGA. The model FPGA board used for this project was A Xilinx PYNQ z2 as Xilinx offers vast repositories of DL resources which is helpful for exploring the benefits of performing DL on the FPGA. These tools include juptyer interface, python coding compatibility, and ease of cost. To implement deep Learning on the PYNQ z2 board, juptyer notebook was used to install virtual climates and download tools. Then code was implemented and weights were set. After testing different packages a image repository was used with 1000 images and was ran through the code. The research resulted in successful runs of AI guessing images based on a small pool of 1000 images. The research shows deep learning using FPGA boards is achievable and could be further improved.

HNSE-P1-8. Deep Learning on a Xilinx Kria KV260 Vision AI Field-Programmable Gate Array Platform

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ABSTRACT

Deep Learning (DL) has revolutionized research and development over the past ten years. Several challenges are that DL requires large power consumption and can be slow. Field Programmable Gate Arrays (FPGAs) are great candidates for implementing DL algorithms and solutions because they are configurable and offer low latency and low power consumption. In addition, the FPGA platform has on-chip memory and computation accelerators, for example adders, which decrease memory bottlenecks and helps to prevent memory and bandwidth issues. Furthermore, due to the versatile architecture of the FPGA, users can design application-specific hardware, instead of using general-purpose hardware found in a processor. The Xilinx Kria KV260 Vision AI (KV260) FPGA board was used for this project as it contains numerous accelerated applications for performing DL with a live camera feed. Three major DL solutions were used: Facial Recognition (FR), Figure Detection (FD), and Object Identification (OI). Overall, FR and FD performed well, but OI currently demonstrated low accuracy. Each DL solution had ten test cases with FR, FD, and OI having 90%, 82%, and 57% respectively. These results show that the KV260 can successfully implement a variety of DL solutions, especially as an edge device. A future implementation is to improve upon the current DL training models to provide better accuracy.

HNSE-P2-1. Recycling Methods for MAPbI3 Perovskite Solar Cells

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ABSTRACT
Halide perovskite solar cells (HPSCs) are a promising renewable energy technology due to their high efficiency and large-scale processing. Many HPSCs utilize lead, presenting health, environmental, and regulatory issues. To mitigate these issues, recycling processes for HPSCs have been researched. This mitigates the risk of lead leakage into the environment while reducing the cost of HPSCs over time. The current methodologies of recycling HPSCs will be reviewed, scrutinizing how recovered lead can be used to manufacture PSCs. To evaluate the efficacy of these recycling methods, the material recoverability and recycled device performance will be considered. Through this, recycling methods that yield high purity precursors for the manufacture of HPSCs will be proposed.

HNSE-P2-2. Towards Drone Assisted Inventory Management

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ABSTRACT
Inventory management drone is a software/hardware framework that allows employers to automate their inventory management process. This framework reduces the risk of warehouse-related injuries and replaces some tedious work. Inventory management drones are one of the cheap options in order to automate this type of work. The following work will build on top of a previously published paper in the AANAPISI Journal. The goal of this research is to upgrade the onboard computer and increase the computational capabilities of the drone. By upgrading the computer, the drone's automation capabilities will be increased. This project will attempt to do longer flight tests and do 3d reconstruction of a mock-up "warehouse." Lastly, the author will attempt to develop end-user GUI for ease of use.

HNSE-P2-3. Surfactant Use in Boiling Heat Transfer Alludes to a Universal Concentration?

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ABSTRACT

Surfactants—molecules that change the surface properties of liquids—can enhance the rate of heat transfer in boiling, which could improve power generation, heating/cooling/refrigeration, and other applications. Boiling involves cycles of bubble nucleation, growth, and departure. These behaviors are modified as surfactants adsorb to the bubble surface, lowering surface tension and changing the bubble contact angle. Unique to each type of surfactant, there is a critical micelle concentration (CMC) above which surfactant molecules aggregate into larger structures called micelles. From conventional wisdom, adding surfactants beyond the CMC increases liquid viscosity, resulting in an overall lowering of heat transfer. Thus, to optimize heat transfer, the optimal concentration should be near the CMC. This is because the Reynolds and Rayleigh numbers of the liquid decrease—reducing the ability of the liquid to convect heat. However, our testing has found that different surfactants experience a marked "bump" in heat transfer performance occurring at the 6–7 mM range. Our results suggest the existence of a universal optimized concentration for surfactants. We hypothesize that this concentration is due to the rate surfactants enter the bubbly region via liquid motion (advection) matching the rate at which surfactants exit the region via bubble surfaces. We are continuing experiments with nonionic (TWEEN families) and ionic (sodium sulfate families) surfactants with vastly different CMCs to see if they all experience a similar "bump" around 6–7 mM. The implications could have great practical impact as engineers could consult a universal concentration to achieve optimal heat transfer efficiency with any surfactant.

HNSE-P2-4. Water Flow Through Hydrogels

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ABSTRACT
Hydrogels are materials made up of three-dimensional, crosslinked networks composed of hydrophilic polymer chains that are serviceable due to their ability to absorb and retain a significant amount of water. The rate of water absorption can be determined by testing the hydrogels' permeability to improve the absorption efficiency. This study aims to determine the water permeability of hydrogels of varying crosslinker ratios to facilitate fast water absorption. Here, an aluminum apparatus was designed and manufactured to apply a pressure distribution to hydrogel samples using a water reservoir and pressure regulator. A LabView simulation was programmed to utilize Darcy's Law to compute water permeability over a time interval. We anticipate that permeability will decrease as the crosslinker ratio increases due to the microstructure of the gel becoming denser. Additionally, we hypothesize that increasing the pressure distribution will compress the gel, also making it denser and decreasing the permeability. The findings will be implemented into an atmospheric water harvester to contend as a possible solution to water scarcity. They will also serve as a base for further research into altering water permeability of hydrogels using freeze/thaw cycles.

HNSE-P2-5. Synthesis and Characterization of Modified Walnut Shell Biochar

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ABSTRACT
Biochar (BC) is a porous carbon material synthesized from different biomasses that are subjected to pyrolysis. This product is an efficient and eco-friendly alternative to conventional absorbents used for contaminant removal in groundwater systems. In this study, we aimed to develop efficient methods of preparing walnut shell-based biochar through acid, base, and steam modification and compare these modified biochars with the unmodified version. The preparation of biochar involved pyrolysis using an argon gas-filled chamber at a temperature of 900 °C. These BCs were then crushed and sieved to separate the microporous particles. To further evaluate the biochars' characteristics, it was characterized using SEM, FTIR, EDS, BET, and contact angle measurements. The modification results showed that the modified biochars have different functional groups and are more hydrophilic than the unmodified biochar. Upon further investigation, the results can vastly improve the usage of biochar in the remediation process of contaminants to make the process economically feasible and environmentally friendly.

HNSE-P2-6. Photovoltaic Panel Inspection and Maintenance

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ABSTRACT
Frequent inspection of photovoltaic panels is essential for keeping them energy efficient as well as increasing the panels longevity by ensuring they have little to no issues so they can keep running for as long as possible. The current process for inspection is very time consuming since solar panel fields are very big and current inspections are done manually. A much more time efficient as well as cheaper alternative to this problem is inspection with robots. The main focus for this project is the use of a motorized vehicle with a thermal camera attached to it to be able detect hotspots and micro cracks as well as other abnormalities in the panels. A 6 degree of freedom arm with a windshield wiper attached to the end effector is used to clean the surface of the photovoltaic panels to ensure the debri causing hotspots if removed. The goal of this research is to reduce the amount of work from humans as much as possible. The advantages of robot inspection are that robots are available to reach more remote destinations and it drastically reduces labor costs and is more efficient compared to manual labor. In this research the tests were implemented at a small scale but only require minor adjustments to have direct transitions to real world application.

HNSE-P2-7. Drones for Monitoring and Early Disease Detection in Plants and Agriculture

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ABSTRACT
The current procedures in place for monitoring crops and plant health are time consuming and labor intensive. It is crucial to diagnose areas of unhealthy vegetation quickly to limit the amount of permanent damage done as well as aiding in the planning for future planting locations. The entire process may be made more efficient with the utilization of drones that provide higher levels of accuracy, speed, and a larger field of view than traditional methods. These drones will be mounted with thermal and RGB cameras that will have the ability to spot irregularities in the wavelengths that are absorbed and reflected by the plants.

HNSE-P2-8. The Analysis of VR/AR Cost and Immersion

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ABSTRACT
Virtual reality (VR) and augmented reality (AR) habitually seek to construct new environments to produce virtual experiences. Virtual experiences are unimaginable to establish in real life, but not in a digital context. These virtual experiences could range from medical procedures in a virtual hospital setting to bizarre worlds in entertainment environments. Nonetheless, the rudimentary necessity to fabricate genuine virtual experiences is immersion. This literature review centers around discovering various aspects that formulate both augmented reality (AR) and virtual reality (VR). This study attempts to comprehend the possibilities and objectives that AR and VR are most compatible with. The upcoming results heavily touch upon immersion (genuine virtual experiences) and cost (physical or software cost) in VR/AR. Overall, VR structures are more immersive to the user in integrating an "out of body" experience but are often more costly due to the equipment needed to perform these computations. AR structures are more available to cheaper alternatives but do not create a serious virtual experience (VE) as VR structures. Both VR and AR environments and objectives, however, combine interdisciplinary areas for a dynamic VE for users.

HNSE-P3-1. Augmented Reality (AR) on the Physical Environment and Mobile Platforms

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ABSTRACT
Augmented Reality (AR) technology can be used with indirect mediums to allow virtual interaction to have a greater impact on society. This research is significant because it contributes to giving users a better experience interacting with their surroundings. The purpose of this study was to test if items can be overlayed on an environment using a phone camera. Additionally, we investigated the type of software required for mobile phone platforms. Researchers used Unity Engine software equipped with a Vuforia mod to overlay a digital world onto a physical environment utilizing fiducial markers. For pathfinding, we used traditional algorithms such as A* and Dijkstra's shortest path. Thus far, results indicate that when development is complete it will be feasible to develop cloud anchor-based navigation in ULABS navigation application as long as the device used is compatible with AR Core. The application will achieve AR navigation by overlaying on top of the physical environment with a fiducial tracker outline to pull virtual objects into reality using a phone's camera. Further research into this subject will continue after the project moves into production.

HNSE-P3-2. Electrochemical Detection of Environmental Contaminants

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ABSTRACT
Due to industrialization and globalization in the late centuries, environments have become increasingly compromised by pollutants. Heavy metals are a common environmental pollutant; they refer to a naturally occurring element having a high atomic weight and high density. Heavy metals, such as lead (Pb), tend to be toxic and present in trace amounts. Pb is a naturally occurring element that can affect virtually every function in the human body upon exposure, including severe damage to the kidneys and nervous system[2]. Interest in detecting lead (Pb2+) in water samples has risen in recent years due to several incidents of community-wide exposure around the world. Cloud point extraction (CPE) is a green chemistry technique used to extract and preconcentrate metals. Limited reports exist coupling CPE to anodic stripping voltammetry (ASV), an electrochemical method that can be used for trace detection of a variety of toxic metals. ASV is an inexpensive and easy to miniaturize technique that can achieve detection limits in the picomolar (10-10 M) range. In this work, Pb2+ was extracted by CPE and analyzed by ASV. The CPE matrix yielded a 38x increase in sensitivity over a traditional acetate buffer matrix with a 1-minute deposition time. The limit of detection (LOD) and quantification (LOQ) were 0.660 and 2.201 ppb, respectively, using CPE. Utilizing acetate buffer at pH 4.65, the LOD and LOQ were 3.202 and 10.670 ppb. Thus, the CPE yielded a 5x improvement in the LOD and LOQ. Overall, this method further exemplifies the wide applicability of electroanalytical methods.

HNSE-P3-3. Synthesis of Novel Fluorescent Molecular Probes for the Diagnosis of Alzheimer's Disease

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ABSTRACT
Alzheimer's disease (AD) is a detrimental, progressive neurodegenerative disease that is regarded as the most common and pervasive form of dementia, affecting an estimated 1 in 14 people over the age of 65 and 1 in every 6 people over the age of 80.1,2 Diagnosing AD at the proper time poses a great challenge in the current clinical setting. Traditional methods for the diagnosis of AD are expensive, provide poor resolution, and involve toxic radioactive materials. This study aims to synthesize a class of novel fluorescent molecular probes that can bind to the protein-plaques that are caused by the onset of AD to ultimately provide a safe and effective method to diagnose the early stages of AD through improved in vivo imaging, potentially becoming an indispensable tool for diagnosis. The final fluorescent molecular probe was synthesized from a simple Sn2 reaction involving a precursor and was characterized using 1H and 13C nuclear magnetic resonance spectra, elemental analysis, thermogravimetric analysis, and solubility properties. The resultant fluorescent molecular probe was successfully synthesized and emits white-light fluorescence in the solution-state when dissolved in water, making it suitable for aqueous systems. Further studies can be expanded upon for in vivo imaging studies, toxicity, and suitability for the clinical setting.

HNSE-P3-4. An Adiabatic Quantum Neural Network Model

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ABSTRACT
Neural Networks are commonly known for their applications across AI vehicles, smart appliances, robotics and more; however, they are limited by their non-polynomial time complexity. This report proposed to replace the feed-forward neural network (FFNN) with a quantum hybrid model and possibly reduce the complexity to linear time. We simulated Adiabatic Quantum Computing (AQC) for any two hamiltonians using python, and we showed that the accuracy scales with time. Then we use AQC to create and classically simulate a "trivial" AQC-QNN model; we state that it is trivial because the model replaces the back-propagation calculation for a perceptron. By testing against labeled 5-bit binary data, we found that the AQC-QNN model yielded 96.875% accuracy on the training set, and we also found that the model increased the time complexity of the neural network overall. While the AQC-QNN fails to reach the run-time goals, this sets up the foundation for an implementation on a quantum computer using the well-known quantum approximate optimization algorithm (QAOA). We expect to yield better run-times with a larger hamiltonian (which would minimize multiple weights, w1,…,wN, at a time) and with QAOA.

HNSE-P3-5. Electrochemical Damage of Biological Matter

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ABSTRACT
In the crisis of the coronavirus COVID – 19 pandemic and the urgency of creating quick methods for creating high-quality vaccines, here we present preliminary results that aim at utilizing electrochemistry on a virus with minimal damage to the capsid, and thus target the DNA/RNA to denature the virus. For this project, we worked with biological matter. In this report we discuss the results of DNA and TMV electrochemically damaged in an aqueous solution. The samples were analyzed via Cyclic Voltammetry (CV), NMR, and UV-Vis spectroscopy. The DNA's fingerprint was significantly altered in all three spectra. Whereas the TMV had significant differences in the CV and NMR but not the UV-Vis spectra.

HNSE-P3-6. Damaging Tobacco Mosaic Virus Using Electrochemistry: A Novel Method to Synthesize High-Quality Vaccines

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ABSTRACT

As a result of the COVID-19 pandemic, it is imperative to develop novel and rapid ways to synthesize highly targeted and effective vaccines. We report a study that tested the effectiveness of using electrochemistry to damage the Tobacco Mosaic Virus (TMV). We hypothesized that by utilizing the acidic properties of DNA and RNA contained by viruses, viral genetic material can be selectively denatured using electrochemistry. We also hypothesized that the viral capsid would be less damaged due to its non-acidic properties and thus the intact capsid could be used as a vaccine vector to promote immune system response. We tested TMV potency by infecting pinto bean seedlings with electrochemically treated and untreated TMV and observed their growth for four weeks. Various spectroscopic techniques such as Nuclear Magnetic Resonance Spectroscopy (NMR) and Ultraviolet-Visible (UV-Vis) Spectroscopy were implemented to assess changes in the electrochemically-treated viruses. Finally, Cyclic Voltammetry (CV) was used to examine oxidative damage in the samples. It was observed that plants infected with electrochemically-treated TMV developed significantly fewer necrotic lesions compared to plants infected with untreated TMV. We also found significant changes in the UV-Vis spectral peaks, NMR spectral peaks, and cyclic voltammograms before and after electrochemical damage. Preliminary results were obtained which suggest that the electrochemical techniques used in this study effectively damaged the TMV virions. Through further testing and improvements, this innovative technique could be used to develop highly targeted and effective vaccines.

HNSE-P3-7. Introduction to Quantum Computing and Information

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ABSTRACT
The world is constantly challenged by complex scientific, economic, and medical problems. In many cases, progress in finding solutions requires the application of modern computing machines. Simultaneously, the classical paradigm based on the turing machine model has well-known limits. Some problems require computing resources that grow exponentially with the size of data, thus making solutions intractable for such applications.
In the past 25 years, researchers have realized that computing machines based on the principles of quantum mechanics might offer a novel strategy for attacking these problems. In this report, we investigate how quantum and classical computers differ. To highlight these differences, we performed several experiments designed and implemented on an IBM quantum computer. In one circuit design, we investigated the measurement outcomes of a quantum system in each state, represented by the symbol |0>, when processed by a Hadamard gate. We observed a distinct measurement pattern for both even amounts of Hadamard gates and odd amounts of Hadamard gates. Results suggest that a Hadamard gate is a so-called noisy gate; in the same way, flipping a coin will result in two evenly distributed outcomes. If that interpretation is correct, one expects the same outcomes for an even number of gates. We resolved this paradox by positing that a quantum state can exist in a so-called superposition state, allowing for the interference of probability amplitudes.

HNSE-P3-8. Automating UNLV's Computer Science Mentorship System

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ABSTRACT
We live in an era where technology is advancing at a fast rate; these technologies often replace menial tasks such as organizing data in general. As data grows, it can become unmanageable for a normal person to maintain. The purpose of this research is to automate the UNLV Computer Science faculty mentor system so that students can sign up and choose their mentor quickly without the need of human intervention. While doing this practical project we intend to learn key concepts of web design and development along with server management, cybersecurity practices, and practicing the research process of learning and applying technologies to an existing problem. We have researched different technologies and how they work together to prototype this project. This includes finding frameworks to use with front-end development, what database management to use, and back-end API to send out emails. The result shows basic functionality of the application where students input their UNLV student email to receive a link where they can submit their information and their preferred faculty mentor. Another feature that was added is an administrator type of account where UNLV faculty members have control in adding or removing mentors and visualizing the data in a tabular form based on the search criteria. As a result of our project, this will automate administrative tasks in the Computer Science department. If other schools within UNLV adopt a mentorship system, then this project is easily expandable and will prove to be useful in other departments.

HNSE-P4-1. The Effects of Male Olfactory Signal in Drosophila Grimshawi

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ABSTRACT
Drosophila grimshawi are found to do Lek behavior and are consuming more time being sexually active at lek sites. It is believed that this action would result in increased mating success. Males discharge these chemical materials to build communal space for females to attend the sites and perform courtship. Mating achievement varied considerably among males and was connected with the time males spent engaged in sexual activity at lek sites (Droney, 1992). Drosophila grimshawi is used to further distinguish the reproductive responses within its species. The chemical signal would determine if it affects the female behavior for mating. The gene expression in male and female brains would be used for RNA sequencing analysis.
The flies are split into two groups, in which one group is the control. For one group, the male is free to streak the base of the dish for about 3 days. Afterward, two flies, one male, and one female are picked on a petri dish and recorded for about an hour. Viewers are expected to watch the recorded videos, track the behaviors that are visible within these flies, and note the data down on an excel sheet. The results prove the chemical signal alters both behavior and gene expression in both genders. However, it only proves that chemical signaling is a pheromone; it does not stimulate mating. There are larger changes in male genes, so it is more useful in male territorial response.

HNSE-P4-2. The Effects of Male Olfactory Signal in Drosophila Grimshawi

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ABSTRACT
The objective of this study is to investigate the effects that lead left at shooting ranges have on local rodent populations. Shooting ranges have been shown by previous research to have a great influence on the level of lead present in nearby soils and plants. This lead contamination has also been shown to have serious consequences for fauna residing near these ranges, ranging from lead toxicity to death. Many shooting ranges exist in Southern Nevada, and we have sampled a small number of these ranges to explore the possible effects they have on nearby rodent populations. The livers of Dipodomys merriami were sampled. We intend to sample additional species and consider life histories in relation to levels of lead toxicity.

HNSE-P4-3. Carnivore Use of Tule Springs Fossil Beds National Monument

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ABSTRACT
Domestic dogs (Canis familiaris) are one of the most well-known carnivorous species on the planet. Despite our familiarity with them, their effects on native fauna in protected areas is still unclear; however, many studies warn that dogs are a potential threat to wildlife. To understand the relationships between domestic dogs and native species, we conducted a preliminary carnivore survey at the Tule Springs Fossil Beds National Monument (TUSK) in Las Vegas, Nevada. Camera traps were placed in 14 different locations for an average of 28 trap nights. They were affixed to approximately 50 cm above the ground and were adjusted parallel to the ground. The cameras were programmed to run continuously for 24 hours/day and captured three photos every minute when triggered. 44,294 images were recorded across the cameras. The most dominant species recorded were humans (155 sightings), followed by domestic dogs (61 sightings), black-tailed jackrabbits (58 sightings), coyotes (46 sightings), and a few other desert species. Results reveal coyotes and jackrabbits were largely present in areas where both domestic dogs and/or humans were seen, and domestic dogs and coyotes were located at sites near residential areas. Our study indicates that coyotes do not respond negatively to the presence of domestic dogs. This is a preliminary survey, so more deployments are needed to form more definitive conclusions regarding the relationships between domestic dogs and native fauna.

HNSE-P4-4. Investigating the Effects of Microorganisms on Microplastics in Anoxic Freshwater Environments

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ABSTRACT
Our purpose in this investigation is to observe the relationship between certain bacterial species and plastic in freshwater, anoxic environments with the hopes of finding one or more species that have the capability to degrade plastics metabolically as a source of carbon or by producing one or more waste products that can be corrosive to plastic. There is evidence that microplastics in the environment can cause harm to living organisms including humans through drinking water, so we will explore the idea that a successful species can be placed in the anoxic environment of wastewater treatment plants to degrade the microplastics found there before the water exits the system since, at this point, there is not a mechanism that can successfully eliminate all microplastics in that system. We have started this project with a sulfate-reducing species called Desulfovibrio magneticus. The methods we used include incubating this species with different types of plastics and measuring sulfate reduction with the spectrophotometer at differing lengths of incubation time. We will use light microscopy and FTIR spectroscopy to observe changes in the plastic and have weighed the plastic before incubation and will weigh them after to determine any weight loss from degradation. Measuring cell counts and concentrations of protein will help determine microbial growth in the incubations. One of the plastic types has shown visible change in color in incubations with bacterial growth and no color change in incubations without inoculation. We will further explore whether this change has occurred because of the bacterium.

HNSE-P4-5. Regulation of Eye Stem Cells During Regeneration

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ABSTRACT
Regeneration is a response to injury that results in the regrowth of damaged or lost body parts. The mechanisms of this process are poorly understood. Studying a highly regenerative species can further our understanding of the natural regeneration process. The African clawed frog, Xenopus laevis, is an excellent model for studying regeneration as it can regenerate multiple structures including its eyes. Xenopus embryos regenerate eyes within 5 days (Kha et al., 2018). The Vacuolar-ATPase (V-ATPase) is a proton pump that moves protons across the plasma membrane. This pump is important in regulating membrane voltage and has been shown to be important for appendage regeneration. Chemical inhibition of V-ATPase blocked embryonic eye regeneration in Xenopus and resulted in a small regenerate eye. Thus, the function of V-ATPase is required for this process. This project aims to determine the role of V-ATPase during eye regeneration by examining the eye defects caused by V-ATPase inhibition. Insights to the regeneration process can lead to potential medicinal applications.

HNSE-P4-6. Systematic Literature Review: Feasibility of Utilizing Cultured Meats in the Food Industry

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ABSTRACT
The introduction of bioengineered meat specimens could be a potential alternative to avoid the negative factors that come along with standard meat. Cultured meat is produced by in vitro cell culture of animal cells using tissue engineering. This process and product has the potential to combat a lot of issues caused by the meat industry while essentially still producing the same product. The purpose of this paper is to expand on the research already conducted as well as to formulate a conclusion on the possibility of bringing cultured meats to the general public. In order to do this a systematic review was conducted for eleven pre-selected articles that were thoroughly read and analyzed. The focus of the research was on investigating the feasibility of producing and consuming cultured meat as well as the possible health and environmental effects it may cause. The findings of the articles suggest that there are currently too many challenges to be overcome and the use of cultured meats in the global market is not feasible in the near future. At this time more research is required before any advancements can be made.

HNSE-P4-7. Determining Organic Content in Soil from the Mojave Desert using Loss-on-Ignition

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ABSTRACT
Measuring the soil organic carbon (SOC) is of vital importance to soil science ecology. With the approaching challenges that rapidly changing weather patterns and temperatures bring, it is becoming more important to be able to measure the organic carbon levels in soil quickly, accurately, and cheaply. Currently, existing methods can very accurately deduce organic carbon levels but are lacking in speed and cost. Using alternate methods such as Loss-On-Ignition (LOI) can make up for lacking speed and affordability and have been shown to be very accurate under the right conditions. Ultimately, having a secondary method to quickly and easily get rather accurate results could be useful to preliminary investigations. The primary objective is to use LOI to accurately estimate the soil organic compound levels of low-elevation Mojave Desert soil. Using soils that were collected from wildfires spanning 15-20 years old, LOI procedures were tested using a factorial design including crucible size, temperature, and time. Using 5 mL crucibles, temperatures ranging from 300 to 600°C and time periods ranging from 2 to 8 h were used in different combinations to obtain the best results. The r2 values were examined for these factorial combinations to determine the most convenient and accurate combination. The results showed that 600 °C at 6 hours had the best results, with an r2 of 0.602. As these are just preliminary results, running a set with a much larger sample size must be done to ensure that the results are consistent.

HNSE-P4-8. Predicting Variant Pathogenicity with Machine Learning

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ABSTRACT

There are roughly 22,000 protein-coding genes in the human body, many of which play important roles in biological functions. The proteins fold in 3D space, and this is most often necessary for function. A genetic variant can disrupt the secondary structure of a protein (one aspect of structure) or eliminate a site important in protein-protein interaction or post-translational modification. The loss of function or deregulation can result in disease. Thus, there is great biomedical interest in identifying disease-causing single-nucleotide variants.

We hypothesize that we can accurately predict variant pathogenicity. We used machine learning to predict the pathogenicity of a set of 28,369 single-nucleotide variants across 10 genes. The data are acquired from publicly available saturation mutagenesis data sets, which generate every possible amino acid substitution at every position in a protein. Our approach employs a support vector machine using linear, polynomial, and RBF kernel functions. The problem is implemented as a binary classification problem, where a label of 1 indicates a disease-causing variant and a label of 0 indicates a benign variant. The model predicts pathogenicity based on amino acid, post-translational modification, and secondary structure information. We cleaned and analyzed the data with custom Python scripts. Our results show average balanced accuracy scores for classifying pathogenicity of approximately 57.9%, 60.3%, and 60.3% for the linear, polynomial, and RBF kernels, respectively. Therefore, the model is an improvement over random guessing but has room for improvement.

HNSE-P5-1. Behavioral Evaluation of a Novel Mouse Model With the Loss of GABAB Receptors

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ABSTRACT
Neurodegenerative diseases (NDD) are described as the progressive degeneration of the central and peripheral nervous system's structures and functions. Neuroinflammation may contribute to deficits in memory and cognition and has shown to be a hallmark in many NDD including: Parkinson's Disease, Alzheimer's Disease, and amyotrophic lateral sclerosis (ALS). Microglia are the main glial cells responsible for mediating neuroinflammation. Microglia alterations could be a key in the chronic neuroinflammation observed in NDD. In addition to neuroinflammation, alterations in neurotransmitter systems can contribute to deficits in learning and memory. The principal inhibitory neurotransmitter in the brain, gamma aminobutyric acid (GABA), has demonstrated to be essential for cognition. Changes in the GABAergic system could lead to impairment of learning and memory. GABAB receptors are G-protein-coupled receptors found on microglia exhibiting anti-inflammatory properties. To investigate the role of the GABAB receptors in neuroinflammation, we developed a novel mouse model, GAB/CX3ert, with a knockdown of the GABAB receptor on microglia. In this study, we examined the learning and memory of the GAB/CXert mice compared to wildtype controls, as well as comparing males and females.

HNSE-P5-2. Methodological Approaches to Measuring Amyloid PET: A Scoping Review in Ethnoracial Minorities

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ABSTRACT
Alzheimer's disease (AD) disproportionately affects Hispanic/Latinx (H/Lx) and Black/African American (B/AA) individuals, who face about 1.5-fold and 2-fold more risk of disease development, respectively, than non-Hispanic whites. Few studies examine AD biomarkers within ethnoracial minorities, especially for newer research techniques, such as Positron Emission Tomography (PET). This study reviews current literature on amyloid PET within H/Lx and B/AA populations, exploring methodological approaches. A scoping review of AD literature was conducted to identify publications with H/Lx and B/AA study samples and amyloid PET data. Two researchers combined search results from three databases, deleted duplicates, and independently reviewed publication abstracts to determine study inclusion. Descriptive trends in the literature were examined. Within amyloid PET literature, 26 articles utilizing H/Lx populations and 33 articles including B/AA populations were reviewed. Of those, 7 H/Lx articles and 8 B/AA articles met criteria for inclusion, from which methodological differences and sample effects were evaluated. Identified studies utilized one of three possible imaging markers, Florbetaben, PiB, and Florbetapir. Some studies utilized a cut-off value to determine amyloid status, although different values were used across publications, and other studies utilized a visual read. Within the B/AA literature, 6 of 8 publications described the same study cohort. Differences in methodology for determining biomarker status makes comparison between studies challenging. Limited diversity within study samples decreases the representativeness and generalizability of findings. Further investigation and greater use of amyloid PET within diverse AD samples may improve diagnostic inequalities; however, greater standardization in methodology is needed.

HNSE-P5-3. Examining the Effects of a Blood Glucose Rescue on Learning and Memory Consistent with Alzheimer's Disease, in Aged Hyperglycemic Mice

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ABSTRACT
Alzheimer's disease (AD) is a progressive neurodegenerative disease that results in tissue damage and cognitive impairment. There are three pathological hallmarks seen in AD: 1) senile plaques, composed of the accumulation of A-beta protein, 2) neurofibrillary tangles, composed of hyperphosphorylated tau protein, and 3) a sustained immune response in the brain (neuroinflammation). A major non-genetic risk factor for AD is type 2 diabetes (T2DM). T2DM confers up to a 1.5 to 4 times more likelihood of developing AD; additionally, 80% of individuals who have AD, have T2DM or glucose intolerance. T2DM Initiates chronic neuroinflammation that leads to an exacerbation in AD pathology. The interrelationship between T2DM and the AD hallmarks are not yet fully understood. The focus of this study was to investigate if the AD deficits seen from T2DM are caused by hyperglycemia or neuroinflammation. We examined both tissue and behavioral data; however, for this project we focused on measuring learning and memory by utilizing the Barnes Maze. The preliminary data from the Barnes Maze video analysis indicated that there were no significant differences in "total latency" between any of the groups. Although there were no significant learning deficits with the STZ drug, preliminary data did show that the PZ group had significantly less "total error".

HNSE-P5-4. Chemically Exhausted Biochar as a Sustainable Replacement for Chemical Fertilizers

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ABSTRACT
Biochar is a carbon rich solid created from agricultural wastes via oxygen-less heat treatment (i.e., pyrolysis). It is used as a soil amendment for its potential to mitigate soil degradation and as an alternative for water treatment because of its ability to absorb nutrients. Recently, biochar has been successfully used by our research group in the removal of nutrients from contaminated water. After exhaustion, biochar has been found to retain significant amounts of nutrients that can be used to improve soil quality, plant growth, and viability. In this research, chemically exhausted biochar used for the removal of nitrate ions in water was incorporated into soil at different ratios and used to grow cherry tomato plants over the course of four weeks and compared against the use of chemical fertilizer. Results suggest chemically exhausted biochar aided in increased plant growth and biomass production of cherry tomato plants because of the increased nutrients supplied by the chemically exhausted biochar compared to the use of chemical fertilizer which created inhabitable conditions for the plants. These methods and results provide a foundation for future experiments exploring the use of water treatment chemically exhausted biochar as a soil amendment.

HNSE-P5-5. Assessing the Effect of Traffic-related Pollutants in Stormwater Contamination

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ABSTRACT
Water is fundamental for sustainable development. Water bodies are basic as supply sources and also serve as stormwater reservoirs for urban communities. The rainwater ends up at local water bodies after its course through roads and sidewalks, collecting suspended solids usually associated with chemical contaminants. These contaminants potentially influence the population's health by generating toxicity to the genetic, immune, and endocrine systems. This study aims to address the effect of traffic-related pollutants in stormwater contamination in the Las Vegas Metropolitan Area (LVMA) as a starting point for identifying solutions to the problem. Roadside dust samples were collected in different locations along the LVMA using an H2O filtration vacuum. The presence of heavy metals (e.g., iron, copper, and lead) and Total Petroleum Hydrocarbon (TPHs) in these samples were analyzed using Hach methods. In each sample, different concentrations of each heavy metal and TPHs were found suggesting that the residue from the vehicles in areas around the valley will reflect levels of contaminants in roadside dust that possess the potential to enter into stormwater effluents and reach Lake Mead, the main source of drinking water for LVMA.

HNSE-P5-6. Elastic Plastic Self-Consistency (EPSC) Modeling on Quartz Deformation Experiments

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ABSTRACT

Our understanding of the rheology of Earth's interior can be advanced by investigating the results of high-pressure deformation experiments on polycrystalline samples using elastic-plastic self-consistency (EPSC) modeling. Our experiment investigates quartz, which dominates Earth's crustal composition and is least resistant to flow during deformation thus its bulk strength is thought to control the strength of the crust. During deformation experiments, a polycrystalline sample is enveloped in a cube-shaped sample assembly which is pressurized by a surrounding multi-anvil press known as a D-DIA apparatus. The D-DIA consists of six tungsten carbide anvils, driven by a hydraulic press that moves the top and bottom anvils independently. The sample is monitored by a high-powered x-ray beam at the Argonne National Lab. X-rays record changes in the distances between crystal lattice planes (d-spacing). Our results and those produced by other investigators show local stress is not homogeneous throughout a polycrystalline sample but varies greatly throughout grain populations. EPSC modeling simulates the anisotropic response of individual grains under load with respect to orientation, boundary conditions, and grain populations to best fit our diffraction data. Our samples reached temperatures ranging from 400 to 840 ℃ and pressures of 1.4 to 2.7 GPa. Lattice reflection spectra on the (101), (110), (200), (201), and (112) were gathered incrementally at sample stains nearing 7%. The lattice strain on these reflections is used along with the EPSC models to derive the bulk strength of the material and which slip systems are operating.

HNSE-P6-1. Comparison of Flights Climbed Between Garmin and Fitbit Devices

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ABSTRACT
With exercise device technology and consumer interest in the field growing, it is important for users to be confident that their wearable fitness devices accurately track their flights climbed. Two manufacturers of devices that track flights climbed are Garmin and Fitbit. Comparing the measurements of flights climbed between devices from these two manufacturers is important to inform consumers as they decide which device to purchase for flight-related activities. PURPOSE: The purpose of this study was to compare the measurements of flights climbed between the Garmin fēnix 5 and Fitbit Versa 2. METHODS: Eight participants were tested individually, and the two devices were assigned randomly to be worn on separate wrists. The participants climbed one, two, and three flights of stairs at a pace of 50, 75, and 100 steps per minute. Each device's display of flights climbed was recorded at the beginning and end of each trial. A 2×9 repeated-measures ANOVA determined whether measurements of flights climbed per trial were significantly different. The α-level was 0.05 for the ANOVA and 0.006 for the post-hoc t-tests. RESULTS: Before adjusting the α-level, flights significantly differed between the devices in 4/9 trials. In every significant comparison, the fēnix 5 reported a lower mean number of flights climbed. However, after adjusting the α-level, flights climbed did not significantly differ between the devices for any trials. CONCLUSION: Depending on the speed of ascent and number of flights climbed, the fēnix 5 and Versa 2 may not provide the same number of flights.

HNSE-P6-2. Coral Bleaching

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ABSTRACT
Coral reefs are a fundamental part of the world's ecosystem; however, they are hidden in the ocean's depths, which makes it difficult to see how they are affected by climate change. When under certain pressures, such as warmer temperatures, coral undergoes a process called bleaching. This causes coral to expel their algae, resulting in the loss of their energy source and vibrant colors. As climate change continues to intensify, the frequency and severity of coral bleaching events threaten the recovery and adaptation of coral species. The Great Barrier Reef, the world's largest coral reef system off the east coast of Australia, has undergone aerial surveys and underwater assessments to measure the corals' levels of heat stress and bleaching thresholds. Ultimately, the data reveals that increased heat stress leads to greater coral mortality. Similar to most species, some corals are more adaptive, while others are more vulnerable. Therefore, it is critical to understand the composition of each coral species and how they differ around regions of the world to determine what proactive measures should be taken to preserve the ocean's ecosystems.

HNSE-P6-3. The Experience of Postpartum Depression in African-American Fathers

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ABSTRACT
There have been more studies that have been conducted to learn about postpartum not only in mothers, but there have also been studies on postpartum in fathers. While little is known about PPD in men, even less is known about how African American fathers experience PPD and other mental health issues. Therefore this area of study is crucial especially as there haven't been any studies focused on this population in PPD. In order for the stigma of postpartum depression in fathers to be normalized, there needs to be necessary education, prevention, screenings, and treatment for fathers especially those in racial groups that are underrepresented. Under the direction of Dr. Brandon Eddy and Dr. Lawrence Jackson, we seek to learn about the experience of postpartum depression in African American fathers. Using semi-structured virtual interviews, we are currently in the process of collecting data from the experiences of fathers by using purposive sampling and snowball sampling. After transcribing the interviews from the participants, coding will occur to find themes within the interviews.

HNSE-P6-4. The Effects of Resilience, Mindfulness, and Experiential Avoidance on Posttraumatic Stress Disorder (PTSD) Symptoms: Exploring the Mechanism of Action of a Mindfulness App for College Student Military Veterans with PTSD

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ABSTRACT
Mediation/moderation models provides an expanded understanding of the underlying mechanism of action of a mindfulness-based interventions, particularly how targeted constructs produce their intended benefits. Hence, the purpose of this study was to investigate the moderating effect of resilience on the relationships mindfulness and posttraumatic stress disorder (PTSD) symptom severity and the indirect effect of mindfulness on PTSD through experiential avoidance as a mediator. A cross-sectional study design was used. We employed a convenience sample of 133 college student military veterans through an online survey (Qualtrics) using measures of resilience, mindfulness, experiential avoidance, and PTSD symptoms. To examine the mediating effect of experiential avoidance and the moderating effect of resilience, we used the macro PROCESS (v. 3.5). We found a direct effect of mindfulness on PTSD and a significant mediating effect of experiential avoidance on the relationship between mindfulness and PTSD. Resilience was also found to have a significant moderating effect on the relationship between mindfulness and PTSD. The major implication of these findings is that higher levels of resilience would strengthen the positive relationship between mindfulness and PTSD and the negative relationship between experiential avoidance and PTSD. This study provides preliminary evidence on the usefulness of integrating resilience development of the mindfulness app we are refining for the next phase of our research study.

HNSE-P6-5. Visual Attention during Observational Learning of Motor Skills: Implications in Rehabilitation after Amputation

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ABSTRACT
It is difficult to stop accidental falls and maintain balance after leg amputation. The goal of post-amputation rehabilitation is to improve mobility function, reduce fall risks, and improve safety. Although there have been advancements in prosthetic technology, individuals with leg amputation are still experiencing frequent falls. We believe this is partially due to the lack of scientific knowledge on prosthetic skill learning after amputation. Post-amputation rehabilitation involves learning and relearning complex motor skills, such as walking and quick stepping to stop falls. This process becomes intense as Individuals perform these tasks with a prosthesis. Our goal was to find a way to make rehabilitation training after amputation more effective. This study examines the effectiveness of incorporating peer-based training during post-amputation rehabilitation. Participants with lower limb amputation will be instructed to watch video demonstrations of balance and recovery tasks performed by an amputee peer or non-amputee. The performance of participants will be tracked before, throughout, and after training. Knowledge from this study will benefit individuals with lower limb amputation by speeding up the learning of prosthetic skills lower limb amputation.

HNSE-P6-6. Synthesis of Novel Fluorescent Probes for the Early Diagnosis of Alzheimer's Disease

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ABSTRACT
Alzheimer's Disease (AD) is a pervasive form of dementia that accounts for 60% to 70% of progressive cognitive impairment within the elderly population. This neurodegenerative disease manifests itself through a progressive decline in motor function, memory, and cognition. AD is closely associated with the accumulation of amyloid- β (Aβ) proteins that form insoluble plaques. The formation of Aβ is a hallmark of AD and can serve as a means for diagnosis. Our objective was to synthesize potential molecular probes for a practical and safe means to detecting AD in its early stages. We synthesized the target fluorescent probes by Knoevenagel condensation to yield p-styryl pyridinium salts of different carbon chain lengths by reacting terephthalaldehyde and γ-picolinium bromide salts. Additionally, counterion exchanges of bromide to tosylate and triflimide were subsequently carried out for each salt in the series. The synthesized probes were characterized by proton (1H) and carbon 13 (13C) nuclear magnetic resonance spectra analysis, elemental analysis, differential scanning calorimetry, thermogravimetric analysis, and fluorescence spectroscopy. Their fluorescent properties suggest that the synthesized probes are viable candidates to be tested in vivo for their binding to insoluble plaques. These findings will serve as a foundation for research into further carbon chain extensions, counter ion exchanges, and structural modifications of fluorescent probes.

HNSE-P6-7. Compressive Strength for Geopolymer Mortar

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ABSTRACT
Portland cement is a common building material used globally and has been around for over one hundred years. It is reliable, inexpensive, and its material properties have been thoroughly researched. However, in recent years, the development of new building materials that are more environmentally sustainable has begun to become increasingly important to combat global warming. Research has shown that geopolymers produce less carbon dioxide emission and could possibly be a substitute for portland cement. Thus the scope of this paper is to determine the compressive strength of geopolymer to portland cement using mortar samples. ASTM C 109/C 109M-02 was followed and used as reference when performing the experiment. Slight variations were made when creating geopolymer mortar samples due to a different chemical structure than that of portland cement. The mortar samples created using portland cement had 18% greater compressive strength than those made of geopolymer. There are multiple types of geopolymers that exist and those may offer similar or greater strength than Portland cement. Though this geopolymer type did not offer the same compressive strength or greater; the results still show that this material has the potential to meet the same strength requirements as Portland-based mortar and concrete.

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