Suffolk
COUNTY COMMUNITY COLLEGE

SURC East
Friday, April 26, 2024
Michael J. Grant Campus
Brentwood, NY

SUNY SURC

Annual Undergraduate Research Conference

Oral Presentation Abstracts

Morning Sessions

54

“The Art of Resistance: Subverting the Male Gaze in Charlotte Perkins Gilman’s Fiction and Advertising Art.”

Argyros M

Morning Oral Presentation- 1, Sagtikos 145, April 26, 2024, 9:30 AM - 10:30 AM

This paper investigates Charlotte Perkins Gilman’s influential and widely studied short story, “The Yellow Wallpaper.” This classic tale follows a nineteenth-century woman whose husband, a medical doctor, has confined her to her home as part of her treatment for an unnamed nervous condition. Unable to physically free herself from this undesirable state, she displaces her creativity onto the yellow wallpaper in her home. While this text has been studied extensively through the lens of feminist theory and critical health studies, this paper assumes a new approach that unites gaze theory and visual culture. Investigating how the controlling male gaze infiltrated women’s products in the nineteenth century, from wallpaper patterns to soapine products; how Gilman stages and manipulates the controlling (male) gaze in her tradecard illustrations through her unconventional marketing strategies and color choices; and analyzing “The Yellow Wallpaper” (in conversation with Gilman’s authorial context), one’s understanding of Gilman’s work is deepened. Furthermore, this research illuminates the mechanisms by which a patriarchal society exerts control over nineteenth century women in the U.S. Providing an “illusion of choice,” a housewife was given the power to decorate the interior space of the home. Yet, the wallpaper patterns available to her merely reflect an identity that society has curated for her—an observation both riddled throughout Gilman’s work and evident within nineteenth century wallpaper designs, sending an inadvertent warning to other nineteenth century women regarding their oppressive state and the products that perpetuate it. Thus, feelings of despondency are not all that Gilman’s work offers; her role as an overarching and creative gaze, which challenges the controlling male gaze, reveals the rebellious feminism at her work’s core.

141

Re-Evaluating the Menorcan High Bottomed Cup as Both a Ritual Vessel and Symbolic Mask

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Morning Oral Presentation-3, Sagtikos 123, April 26, 2024, 9:30 AM - 10:30 AM

The Menorcan high bottomed cup (el vaso de fondo alto Menorquin) is an indigenous style of ceramic vessel that is unique to the Post-Talayotic (c. 550-123 BCE) culture of the Balearic Island of Menorca, off the east coast of Spain. Several hundred examples of these cups have been found at sites around the island, including one at the site of Torre d'en Galmés that was excavated by the Menorca Archaeological Project (MAP) in the summer of 2021. Although the style is distinctive, the exact meaning behind the style itself is unclear. However, archaeologists in Menorca have generally accepted that the designs can be interpreted as showing phytomorphic (plant-like) or tauromorphic (bull-like) motifs. After excavating with MAP during the 2023 season and seeing some of the cups in person, this paper proposes an alternative interpretation, where the cups function as both votive drinking vessels and as transformative masking devices within the context of ritual and funerary spaces in Menorca. This research also incorporates the possibility of identifying external influences or comparable ritual vessels and contexts from around the Mediterranean.

145

The New York Slave Rebellion of 1712 and the New York Slave Conspiracy of 1741 and the lessons they hold.

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Morning Oral Presentation-3, Sagtikos 123, April 26, 2024, 9:30 AM - 10:30 AM

My research, conducted under the guidance of Dr. Marshall, delves into New York's deep-rooted history of slavery, shedding light on slavery beyond the well-known Southern plantation narrative. It was a system that occurred in the North, and thrived here in New York, before its abolition on July 4, 1827. What should have been a reckoning, once the bones of the enslaved were uncovered with the discovery of the Negroes Burial Ground in 1991; New York's slave past continued to be forgotten for another three decades.
The time to confront the past has now come. I will begin that narrative by tying in some contemporary place names with slavery before delving into the past and discussing the introduction of slavery under Dutch rule, where slaves experienced a system that was quite different from the one, they would experience under English domination. I will discuss the New York Slave Rebellion of 1712 and the New York Slave Conspiracy of 1741. These uprisings were desperate attempts by the slaves to resist the oppressive conditions, while futile, they also provoked severe punitive measures that further highlighted the systemic cruelty of the time.

My research illustrates how New York's early affluence was built on the exploitation of enslaved Africans. Acknowledging these forgotten chapters of New York's history is crucial for addressing racial disparities and moving towards a more equitable society in the future. The past few years have proven that slavery is no longer just a relic of the past, but a shadow that lingers over the contemporary issues of our time. I will give a narrative that is interwoven with facts examining New York's slave history. I will let the audience decide if my presentation underscores the necessity for a comprehensive understanding of America's slave past to foster true social reconciliation and justice.

148

Closeness After Texting Versus In-Person Interactions

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Morning Oral Presentation- 1, Sagtikos 145, April 26, 2024, 9:30 AM - 10:30 AM

This experiment examined interpersonal closeness among unacquainted college students who were paired and randomly assigned to communicate either in person or remotely by text. The participants spent 45 minutes asking and answering closeness-generating questions (Aron et al., 1997) that escalated in self-disclosure. Previous research has examined the modality of interpersonal communication and found that more sensory-rich modalities, like video and virtual reality, resulted in closer connections between strangers compared to less sensory modalities, like texting (Agnew et al., 2022). In the current study, the students engaged in their 45-minute interaction and then individually answered survey questions that included eight measures of closeness to their partner. We computed an overall closeness score by summing the responses to those eight questions (Cronbach's alpha = .87). The mean closeness score for the in-person participants was 43.8 (s = 7.9). The mean closeness score for the texting participants was 41.2 (s=7.2). The difference between these means is in the predicted direction and approaches significance, $t(88) = 1.6$, $p = .11$. Two weeks after participation, responses to an anonymous survey found that compared to the texting pairs, the in-person participants reported a non-significant trend to have been more likely to have been contacted by their partners, to have made contact with their partners, to feel closer to their partners, and to have a desire for a closer relationship. Given the importance of developing interpersonal relationships among college students, this research provides practical applications to increase students' social connections which can enhance the sense of community on campus as well as students' mental well-being.

156

The Kondo Effect through small doping of Ce in LaSbTe

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Morning Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 9:30 AM - 10:30 AM

The Kondo effect is a phenomenon observed in solid-state physics that occurs in metals and semiconductors containing magnetic impurities, such as atoms with unpaired electron spins. At high temperatures, these magnetic impurities scatter conduction electrons, leading to an increase in electrical resistance. However, as the temperature decreases, an unexpected decrease in resistance occurs. This counterintuitive behavior is the hallmark of the Kondo effect.

In this work, we report on the Kondo effect in a compound with the nominal formula Ce(x)La(1-x)SbTe and nominal Cerium content x = 0.1. Our choice of elements was meticulously guided by their exceptional ability for homogenous mixing in solid state environments. Notably, among these elements, only Cerium (Ce) harbors a magnetic moment, while the other three constituents remain nonmagnetic. This selection yields a distinct scenario: a system characterized by the nearly random dispersion of magnetic impurities amidst a nonmagnetic metallic host. Such a configuration offers a unique platform for probing the intricacies of the Kondo effect, where magnetic impurities interact with conduction electrons in a complex interplay, significantly influencing the alloy's properties.

The incorporation of a small amount of Cerium (Ce) into LaSbTe will be achieved through crystal growth. Subsequently, these crystals will undergo meticulous analysis using X-ray diffractometry to ascertain their structural characteristics. Additionally, various properties of the crystals will be systematically measured to comprehensively understand their behavior.

163

Roots & Routes: The American Experience

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Morning Oral Presentation-3, Sagtikos 123, April 26, 2024, 9:30 AM - 10:30 AM

The current study seeks to explore issues faced by US college-age students with foreign-born parent(s). I chose this topic because there is little research focusing on the conflicts that exist in families due to the differences in acculturation between foreign-born parents and their children. This difference can lead to many challenges in family dynamics. In the US one quarter of all children under the age of 5, have at least one foreign-born parent. Individuals sometimes come with their families, while others come to reunite with them (Bornstein, 2017). First-generation immigrants face acculturation and assimilation issues, as do their children. Issues such as language brokering, acculturation gaps between parent and child, different cultural value systems, lack of knowledge about educational systems, and lack of professional models, all are sources of vulnerability for the child during development and ultimately impact their academic success (Kim et al, 2020). As the population of students with foreign-born parent(s) rise in the US, more programs should be tailored to help assist these college-age students. The current study examines young adults' perceptions of their parent(s) experience before, during and after immigrating to the US and the ways in which such perceptions affected their development. Preliminary results indicate that children with foreign-born parent(s) rarely have access to the kinds of resources that would help ameliorate these types of conflicts, particularly in ways that affect their educational aspirations. Another emergent issue from this study is the report of consistent inability of foreign-born parent(s) to see the financial return on post-secondary education. Ongoing conversations with students and their parents about the academic journey and the financial and psychological benefits of higher education were consistently endorsed. It is hoped that this research on the challenges faced by first generation college students will allow us to design programs to enable them to thrive.

223

Effect of pH on Superoxide Generation upon UVA Irradiation of 6-Thioguanine

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Morning Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 9:30 AM - 10:30 AM

Numerous illnesses, such as cancer, neurological disorders, and cardiovascular ailments are linked to this oxidative damage caused by superoxide. Due to 6-thioguanine's incorporation into DNA during replication, it has been investigated for its potential as an anti-cancer drug because it can impair cell development and disturb the proper functioning of the genetic code. Normal cells have a pH of 7.2 in the intracellular space and a pH of 7.4, but cancer cells have a pH of 6.7-7.1 in the extracellular space. This study monitors the effect of pH on superoxide generation on UVA-induced 6-thioguanine (6-TG) photosensitization in the presence and absence of glutathione (GSH). To do this solution of GSH, Nitro blue tetrazolium chloride (NBT), 6TG, and water will be irradiated, and they will be altered so each vial has a pH of 1-14. By irradiating them, the superoxide's can be captured in the NBT complex where their absorbance can be measured with a photo spectrometer. Each solution was run over the pH range of 1-14 at the ideal wavelength of 555 nm to determine the absorbance. 6-thioguanine can start a complex chain of photochemical processes that create superoxide when exposed to UVA light. In this experiment, GSH keeps the energy pathway going by reducing the inactive 6-TG so that the generation of superoxide is maximized. The NBT complex captures the superoxide and shows a blow color when superoxide is present in the solution. It could be seen that there is an increase in superoxide production at more basic pH's showing that basic environments enhance the production of superoxides. This means there is an increase in superoxide production as the solution goes up the pH scale from acidic to basic A pattern is seen at the wavelength 555 nm, which is the peak wavelength at which the NBT complex traps superoxides. A minimal absorbance of 0.085 is found at pH 1, while a maximum absorbance of 1.355 is found at pH 14. This is significant because these results can help explain not only thiol-regulation in a biological system but chemoprevention of cancer.

228

Effects of crystallographic phase transitions on the thermodynamic properties of CoIn2

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Morning Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 9:30 AM - 10:30 AM

We investigate the results of crystallographic phase transitions and their effects upon the thermodynamic properties of CoIn2. We specifically observed for the first time a change in crystallographic symmetry related to an intermediate phase. Both the high temperature (300K, orthorhombic) and low temperature (90K, monoclinic) phases were studied in previous experimental reports. We synthesized the material through single crystal flux growth and double induction melting techniques, and we characterized the structure via single crystal X-ray diffraction. We refined X-ray diffraction data in the CrysAlisPro program, while the structure and goodness of fit were solved in Jana 2006 and VESTA. In this intermediate phase, we discovered that CoIn2 remained orthorhombic but was the high temperature space group Fddd. We showed conclusively that this material has two structural transitions at 195 K and at 205 K and a direct transition from orthorhombic Fddd to a monoclinic C2/c.

255

Training Automated Speech Recognition Systems to Code Switch using Large Language Models

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Morning Oral Presentation- 1, Sagtikos 145, April 26, 2024, 9:30 AM - 10:30 AM

Code-switching refers to the linguistic behavior of individuals who fluently speak multiple languages, transitioning between two or more languages within a single conversation. People code-switch to express themselves accurately in a language other than their current language. In the Hispanic community, code-switching is a complex problem, as low-literacy Hispanics do not feel confident fully communicating in English, which installs a barrier between proper communication when English is the expected language to be spoken. Low-literacy Hispanic's main communication form is speech, so there would be a mix of English and Spanish. Intelligent tutoring systems (ITSs) could be used to support code-switching Hispanics. ITS simulates the role of human tutors in certain subjects, employing constructivist education methods, prompting thorough explanations, and delivering feedback. ITSs fundamentals heavily rely on automatic speech recognition (ASR). ASR can process human speech and then produce writing. This study focuses on collecting code-switching data, performing some initial analysis with code-switched data, and conducting experiments with Whisper. Whisper is an ASR system by OpenAI that enables transcription in multiple languages. We used Whisper to transcribe code-switching conversational data that also has a human transcription. Our findings indicate Whisper could not accurately generate the transcriptions. Once we verified the accuracy of the human transcription and compared it with the Whisper-generated transcription, we concluded Whisper was not a reliable transcription tool. It is essential for ASRs to accurately recognize code-switching so the ITS can effectively be used as a personalized tutor. This calls for an ASR system that better fits interactions of low literacy populations in a tutoring system and models that can handle and process code-switching to be made. With our research, we aim to bridge the gap between low-literacy Hispanics using ITSs to increase learning performance and content recall with code-switching.

126

Safe Spaces in Benjamin Alire Sáenz's Aristotle & Dante Discover the Secrets of the Universe

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Morning Oral Presentation- 4, Sagtikos 145, April 26, 2024, 10:45 AM - 11:45 AM

Benjamin Alire Sáenz's Aristotle & Dante Discover the Secrets of the Universe follows two young boys who navigate their queer sexualities in El Paso, Texas during the late 1980s. During a time when "safe spaces" for queer folks, as we recognize them today, were nearly nonexistent, Aristotle and Dante are limited to finding solstice within liminal spaces of natural life. Liminal spaces such as water and the night sky giving way to outer space are paramount in this text, and when examining the namesakes of the central characters, the use of these spaces becomes much more intentional in the text. Aristotle's philosophies on space and Dante's tale of Narcissus seep into Sáenz's text, molding the way the central characters perceive and utilize these spaces within the text.

140

Senior design project of the R.O.S.S.I.E. submarine

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Morning Oral Presentation -6, Sagtikos 123, April 26, 2024, 10:45 AM - 11:45 AM

In this project, our aim is to develop a remotely operated vehicle (ROV) tailored for efficient, accurate, and cost-effective environmental data collection. Our ROV integrates key sensors, including strain gauges for pressure and depth, temperature, pH, turbidity, current, and potentially lidar/sonar and proximity sensors. Real-time data acquisition is facilitated, enabling comprehensive monitoring and study of underwater ecosystems and environmental conditions. The control system design prioritizes seamless maneuverability and precise data collection, empowering the ROV to navigate complex underwater terrains.

Throughout the project's initial phase (SD1), we successfully implemented a cohesive sensor integration and data acquisition and ROV control system, uncovering valuable insights into previously inaccessible underwater realms. Our focus on diverse underwater environments demonstrates the ROV's efficacy in data collection missions. The collected environmental data not only contributes to ecological studies but also holds significance for environmental monitoring and scientific/industrial research.

Moving forward, our next steps involve refining the ROV's capabilities and conducting further data collection missions to enhance its adaptability to various underwater scenarios. This project holds broader implications for marine science and technology, offering a unique tool for understanding aquatic ecosystems, biodiversity, and oceanography. By providing a cost-effective and accessible solution, our ROV contributes meaningfully to the larger field, appealing to a wide audience interested in advancing environmental research and exploration.

154

Promoting Campus Fitness Center Use with Matched Buddies and an In-Person Tour

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Morning Oral Presentation- 4, Sagtikos 145, April 26, 2024, 10:45 AM - 11:45 AM

Extensive research has recognized that consistent exercise is key to physical, social, and mental health (Calestine et al., 2017; Ji & Zheng, 2020). However, less research has examined how to successfully encourage exercise, especially among samples who don't exercise regularly. Researchers have reported that exercise typically decreases among students after high school (Calestine et al., 2017). The current study was designed to examine a strategy that could be easily implemented to encourage fitness center use on a college campus. College student participants were randomly assigned to one of three experimental conditions: receiving a group tour of the fitness center, being matched with a "fitness buddy" who holds similar exercise interests and taking the fitness center tour together, or being on a waitlist for a future tour. We predicted that participants who received the tour with a potential fitness buddy would have the strongest intentions to use the college fitness center. The results supported this prediction. A one factor ANOVA revealed a significant effect for tour type, $F(2, 109) = 3.31$, $p = .04$. A post hoc LSD test was conducted. Participants who went on a tour with a matched fitness buddy reported significantly greater intent to use the fitness center in the upcoming week than those on the tour waitlist ($p = .02$). We also intend to examine follow-up fitness center records to determine if intentions coincide with actual use. Recreation and athletics administrators are encouraged to apply these research findings to boost student use with their facilities, consequently elevating their physical fitness as well as their social connections and mental well-being.

158

The Effects of Goal Setting and Social Norms on Commitment to Attendance

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Morning Oral Presentation- 4, Sagtikos 145, April 26, 2024, 10:45 AM - 11:45 AM

In light of the COVID-19 pandemic's negative impact on class attendance (Weijers et al., 2022), we examined strategies to increase in-person college class attendance. The current study examined two persuasive factors: goal setting and social norms. This experiment was a 2 (attendance goal vs. general academic goal) x 2 (norm to attend vs. no norm) experimental design. Participants were randomly assigned to one of the four experimental conditions presented in a Google Form survey. We used inter-rater reliability to measure participants' open-ended responses to assess the specificity of their goals related to attending class. We were also provided access to attendance records for two weeks following our experiment. We predicted that the attendance norm and attendance goal condition would prompt greater attendance and greater specificity of their attendance goals. While we did not find support for that prediction, we did find a significant norm x goal interaction for the measure of participants' specificity of their attendance goals, $F(1, 87) = 5.5$, $p = .02$. For students presented with the attendance norm, there was no difference in the specificity of their attendance goals depending on the type of goal they set. However, students presented with no norm had greater specificity of their attendance goals if they made an attendance goal compared to a general academic goal. The current study was limited by the variability of the participating classes' meeting dates (which included exam dates and missing attendance records). We encourage future researchers to take advantage of data-based persuasion theories to enhance college student attendance which is a key factor in academic success.

166

How Did the Pandemic Affect the College-You?

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Morning Oral Presentation -6, Sagtikos 123, April 26, 2024, 10:45 AM - 11:45 AM

The COVID-19 pandemic had unprecedented effects on society. It brought about times of financial hardship, health concerns, food insecurity, and legal concerns globally, and in the US, it disproportionately affected immigrant communities (Clark et al., 2020; Solheim et al., 2022; Kchhar & Bennet, 2021). It changed the learning environments across the educational spectrum, and children of immigrants disproportionately experienced these negative effects (Soria et al., 2020). Neuwirth et al (2020) discuss the need to address these issues for first-generation and minority students and suggest that education has still not recovered from these extraordinary disruptions. The present study examines the continued effects of the pandemic on the academic pursuits of first-generation and minority college students and the challenges faced. As a first-generation college student, I experienced the educational, social, and financial dislocation caused by the pandemic, and know that many of these effects persist. My personal experiences such as adapting to classes online, studying while at the same time coping with the financial crisis of parental unemployment, taking on additional hours at work and the ways in which these challenges persist, motivated me to design this study. Consistent with recent research, preliminary data from our study finds that disruptions in the learning environment were particularly detrimental to first-generation college students. Students report that the challenges persist to this day. For example, while many first-generation students report serious difficulties with online courses which were necessitated by the pandemic, they experienced lowered academic performance and motivation, however, they still are enrolling in online courses because it enables them to work and continue to contribute to family finances. Students also report that while there was some support for dealing with the virtual classroom, these supports have been severely curtailed. The data from this study indicates that there needs to be more nuanced academic and financial support systems provided on campuses to support these students.

182

Enhancing Prime Editing: Refining Techniques and Efficiency with Zebrafish Models for Human Genetic Disorders

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Morning Oral Presentation- 5, Sagtikos Theatre, April 26, 2024, 10:45 AM - 11:45 AM

Genome editing has both widespread clinical applications and uses for developing animal models of human disorders. Precise genomic editing methods to correct and study pathogenic alleles in-vivo has been impeded by limitations in current technologies, such as off-target effects and inefficiencies in addressing all types of mutations. Prime editing (PE), a novel 'search-and-replace' genome editing strategy, promises to overcome these barriers by enabling targeted insertions, deletions, and all 12 types of base-to-base conversions without double-strand DNA breaks (DSBs) or the need for donor DNA templates. PE utilizes a bifunctional Cas9 DNA nickase fused with a reverse transcriptase and a prime editing guide RNA (pegRNA) that directs the edit. In this study, we sought to generate a missense mutation (M706V) in the zebrafish GRIN1 gene, a mutation correlated with autism spectrum disorder (ASD) and epilepsy, while concurrently refining the PE technique for improved efficiency. This entails optimizing the PE system in zebrafish through an examination of numerous variables, including the structure of PE, the configurations of pegRNA, and the methods of delivery. Zebrafish are valuable for such research due to their genetic similarity to humans, rapid and transparent development, allowing direct observation and streamlined analysis. Our results reveal varied efficiencies among distinct PE constructs, namely PE2, PE6B, PE6C, and PEmax, with PE6B emerging as the most proficient construct. Furthermore, while these PE constructs are typically deployed as proteins, our insights underscore that their mRNA counterparts are also effective. This revelation broadens the potential application of PE constructs, enhancing their versatility and utility in genetic research. Overall, our findings provide a crucial steppingstone toward the application of prime editing both for developing animal models and for clinical applications.

194

Neurodevelopmental Lead Exposure Causes Disruptions in GABAergic Inhibitory Signals: Understanding Brain Excitability Seizure Problems Through Seizure The Rat Model

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Morning Oral Presentation- 5, Sagtikos Theatre, April 26, 2024, 10:45 AM - 11:45 AM

Neurodevelopmental lead exposure produces a range of insults to the developing brain, of which, decreased evoked neurotransmission and increased spontaneous neurotransmission occurs. These aberrant physiological signals provide evidence of an imbalance in proper excitation-to-inhibition balancing of neuronal membrane potentials that emanate from an altered GABA-shift. These persistent brain excitability problems continue with the developing rat into adulthood. In order to explore how these brain excitability issues manifest, we exploited two different neurotransmitter systems (i.e., acetylcholine with Pilocarpine 380 mg/kg i.p. and glutamate with Kainic Acid 5 mg/kg i.p.) using an in-vivo pharmacological model of seizure generation. We then evaluated the inter-ictal-times to assess the GABAergic response to the manipulated and the Fast Fourier Transform (FFT) of the excitability across the different brain waves to characterize these long-term effects of early life lead poisoning. The data show different patterns of brain excitability based on sex, dose of lead (150 ppm or 1,000 ppm) and physiological signatures of the brain waves. Interestingly, the brain waves were different between the Pilocarpine and Kainic Acid treatments, but the decline in inhibition was not. Overall, these findings suggest early neurodevelopmental lead exposure can have persistent alterations in the physiological neuronal membrane properties that can cause improper neurotransmitter signaling and less capable GABAergic regulation of the limbic system which is crucial for adolescent and young adult brain development.

195

Lead Exposure Induces Neuropathological Changes in Chicken Embryos That Are Reversed By Taurine

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Morning Oral Presentation- 5, Sagtikos Theatre, April 26, 2024, 10:45 AM - 11:45 AM

Neurodevelopmental lead exposure is has been shown to cause significant cognitive and behavioral deficits in a number of mammalian model systems. These deficits cause persistent changes in the brain that may be recovered with pharmacological treatments during critical periods of neurodevelopment. The present study evaluated the effects of 500 nM exposure of taurine, lead acetate, and taurine + lead acetate on fertilized chicken eggs when compared to control eggs. The eggs were treated and then incubated for 9 and 14 days, then the embryos were examined for differences in body weight, brain weight, and the quality of the embryos. The results showed that control embryos were normal weight and quality with the largest brains. The lead acetate treated embryos had some mortality, were significantly reduced in body and brain size, and its overall quality. Interestingly, lead acetate + taurine treated embryos showed substantial recovery that nearly reversed the deficits observed in the lead alone group. These findings suggest that avians may be more sensitive to neurodevelopmental neurotoxicants such as lead and that taurine, even in the avian system serves as a strong neuroprotective compound mitigating against lead induced neuropathogenesis and may be a useful pharmacological therapy for avians subjected to or at risk for such lead-induced environmental exposures as part of the commercial food supply chain and the organic from farm to table. Lastly, avians may serve as a viable alternative animal model system to assess lead neurotoxicant exposures and potential screening of pharmacotherapies to address this longstanding environmental contaminant and neurotoxicant.

279

The Effects of Neurodevelopmental Lead Exposure on Rat's Fronto-executive Functions: Sex-dependent Differences in Taurine Neuroprotection

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Morning Oral Presentation- 5, Sagtikos Theatre, April 26, 2024, 10:45 AM - 11:45 AM

Prior studies have shown that the Attention Set-shift Test (ASST) is very sensitive in detecting disruptions in fronto-executive functions in adult rats caused by early neurodevelopmental lead exposures. The present study sought to evaluate the use of taurine (2-aminoethanesulfonic acid) in ameliorating lead poisoning brain insults across development. Rats were given 150 ppm lead acetate in their drinking water and another group was given 150ppm lead acetate + 0.05% taurine in their drinking water. Rats were raised in either perinatal (PERI;from breeding to postnatal day 22) or early postnatal (EPN; from birth to postnatal day 22) developmental time-periods of lead exposure. From postnatal day 22 onward all rats were removed from lead exposures and drank regular water. Between 60-90 days the rats were tested on the Neuwirth-BrownTM ASST. All lead exposed rats showed deficits in the ASST, with female rats exhibiting more pronounced fronto-executive dysfunctions. When treated with taurine, these fronto-executive dysfunctions were recovered in the female EPN and PERI rats and in the male PERI rats. Interestingly, the male EPN rats were unresponsive to taurine treatment implicating a male sex trait in early postnatal development that appears to be vulnerable to lead. Future studies will need to explore in the EPN male what neurochemical and receptor systems in the prefrontal cortex are compromised causing the lack of taurine recovery unlike the other groups of rats.

Oral Presentation Abstracts

Afternoon Sessions

12

Analyzing Selection Biases by Line-of-Sight Structure in Strong Lensing

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Afternoon Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 1:45 PM - 2:45 PM

Title: Analyzing Selection Biases by Line-of-Sight Structure in Strong Lensing

As the universe continues to expand, our understanding of its vast complexities grows. Accurately measuring the expanding rate also be known as the Hubble Constant is one of the main goal of modern Astronomy. In recent years, strong lensing time-delay cosmography is a newly implemented methodology of measurement of the Hubble Constant. In regions of strong lensing, while the main contribution is primarily from a single massive deflecting body, the effects of line-of-sight directions known as external convergence and external shear could significantly influence observable quantities and need to be well modeled. Specifically, with the forthcoming of The Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST), an large volume of strong lensing events is anticipated, bringing to light the significant impact of line-of-sight (LOS) structures. This research delves into the selection biases in strong lensing, exacerbated by LOS structures.

In this study, we simulate the large-scale structure, constructing low-resolution convergence and shear maps. On top of the low-resolution map, we add substructure by building higher resolution convergence and shear distribution with ray-tracing technique on rendered halos inside light cones based on the analytical halo mass functions from N-body simulation. We construct a realistic joint distribution of external convergence and external shear tailored to specific main deflector and source redshifts. Through extensive Monte Carlo simulations, we assess the selection biases in strong lensing events, particularly in the context of galaxy-galaxy lensing using the SLSim.

50

Considering the Comfort Level of Underrepresented Employees at SUNY Brockport

Millen G

Afternoon Oral Presentation-3, Sagtikos 123, April 26, 2024, 1:45 PM - 2:45 PM

Universities have dedicated considerable effort in recent years to have better practices of equity, diversity and inclusion related to underrepresented students. These practices have varying levels of success and community buy-in, but universities nonetheless attempt to understand challenges faced by underrepresented students and address them. But what about underrepresented employees at the same institutions? Qualitative research has revealed that underrepresented employees at SUNY Brockport face unique challenges which inhibit their comfort level. Some of these challenges resulting from being underrepresented at a predominantly white institution (based on student population demographics) include microaggressions from peers, assignment of extra obligations, denial of certain opportunities and privileges, and being marginalized and discounted in their departments. To maintain a functional comfort level, support the student body, and succeed professionally despite these challenges, underrepresented employees practice specific coping strategies. Underrepresented employees often develop these strategies with more ease when they have a workplace mentor who is familiar with the unique stressors underrepresented individuals face. Underrepresented employees' comfort level being improved can only make them more professionally successful, and this can only make the university more successful. Thus, this research is relevant to anyone concerned with strengthening SUNY Brockport as a workplace and community or understanding what underrepresented employees may experience at similar institutions.

52

Harmonizing Equality: Ester Deans Journey to Empower Women in Music

Fernandez A

Afternoon Oral Presentation -1, Sagtikos 145, April 26, 2024, 1:45 PM - 2:45 PM

The multifaceted career of Ester Dean demonstrates the invisibility of behind-the-scenes workers within the dynamic world of the music industry. Dean advocates for a more inclusive environment for aspiring female artists in addressing the marginalization regarding gender inequality, male dominance, and creativity. She migrated to a career as a ghostwriter because she felt she wasn't "pretty enough" to be on stage. My research shows that, dating back to the 18th century, stereotypes and discrimination against women have curtailed their musical pursuits. Despite its little to no progress, contemporary figures like Dean highlight a continuous gender gap in roles such as songwriting, label ownership, management, and representation, with a striking ratio of 6 men to every 1-woman songwriter. The imbalance is not a reflection of one's musical ability but rather a societal construct that ethnomusicologists continue to explore. There is no evidence that one sex should possess more music ability than the other. Recognizing women's historical contributions influences the industry's culture and can create a more comfortable environment for future female musicians.
Dean reveals the hidden threads of the music industry's dynamics in multiple interviews, expressing through her career an example of a truthful glimpse into the triumphs and challenges that have shaped her within her musical journey.

123

Assessing the Thermal Conductivity, Moisture Transport, Fire Resistance and Mechanical Properties of Hempcrete

Glenda Rodrigues Santos Giordani

Afternoon Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 1:45 PM - 2:45 PM

Hempcrete, a sustainable building material composed of hemp shiv, lime, and water, presents a promising eco-friendly alternative to traditional insulation. Recognized for its carbon sequestration capabilities, hempcrete effectively absorbs CO2 over its lifecycle. This study evaluates hempcrete's thermal conductivity, moisture transport, fire resistance, and mechanical properties through a series of controlled experiments and modeling to ensure its viability as a sustainable building material. The hypothesis is that hempcrete can deliver effective thermal insulation and moisture regulation, withstand fire, and sustain mechanical loads in building applications. Our objective was to validate hempcrete's performance and solidify its thesis as a superior alternative to traditional materials.

Our multifaceted methodology began with the assessment of thermal conductivity through heat conduction tests in a controlled environment. Each sample had an embedded AC/DC 12V 200°C heating element, which underwent a current test. Data collection was collected by a 4-channel K-type thermometer. For moisture transport evaluation, we exposed the blocks to constant humidity, and Arduino-synchronized thermistors acquired the data. Fire resistance testing involved direct high-temperature exposure of the blocks, using a thermal camera to collect thermal data, followed by visual analysis to assess material integrity. The mechanical properties were examined through compressive strength tests on an INSTRON machine with a 150KN capacity, simulating standard loading conditions on hempcrete at a compression rate of 0.25mm per second, to determine the material's Young's modulus.

Our results underscore hempcrete's superior thermal insulation, evidenced by a thermal conductivity of 0.0911 W/m K, and robust mechanical strength, indicated by an average Young's modulus of 6MPa. Additionally, its resistance to moisture and fire underscores its potential in ensuring building safety. These attributes are crucial for its use in insulating infill walls.

The significance of this work lies in its comprehensive experimental evaluation of hempcrete's performance, offering a data-driven affirmation of its suitability for sustainable construction. The current state of the project indicates that, with further optimization and scalability considerations, hempcrete could revolutionize the construction industry by providing an eco-friendly, carbon-negative, and energy-efficient alternative to conventional materials.

147

Visual Generic Aware Planner: Embed Intelligent Hex Color Code Construct

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[1]Old Westbury

Afternoon Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 1:45 PM - 2:45 PM

This proposed system is a spin-off from the NASA Traffic Aware Strategic Aircrew Requests (TASAR) and for the short, Traffic Aware Planner (TAP), which monitors potential flight trajectories in real-time. Its primary function is to update flight patterns to better optimize flights in case of potential hazards or conflicts. The objective of TASAR is to improve the process in which pilots request flight path and altitude modifications due to changing flight conditions. Changes may be made to reduce flight time, increase fuel efficiency, or improve some other flight attribute desired by the operator. Currently pilots make such requests to Air Traffic Control (ATC) with limited awareness of what is happening around them. Consequently, some of these requests will be denied resulting in no flight improvements and an unnecessary workload increase for both pilots and ATC. Our system which is derived from the concept of the TAP and is known as Visual generic Aware Planner (GAP): Embed Intelligent Hex Color Construct. Our business introduces

1. A novel approach and idea to enhance and improve TAP by incorporating idea of embedding intelligent hex color code into the system as well as integrating Plan-Oriented Concepts.
2. A color branding technique and implementation utilizing hex web colors (RGB) with their dedicated, meaningful codes that identify the business's mission, vision, and values and possible timelines. This technique aims to disrupt the traditional assignment of color codes by web designers or other stakeholders, favoring instead the cumulative decision-making of organizational managers involved in day-to-day operations.

149

Why Do People Want Tattoos?

Parker A[1]
[1]SUNY Purchase College

Afternoon Oral Presentation -1, Sagtikos 145, April 26, 2024, 1:45 PM - 2:45 PM

The literature indicates a negative correlation between visible tattoos and employment. Moreover, tattoos are expensive, and their removal can cost four to five times the price of getting one, with no guarantee of success. Despite the direct and indirect costs, as well as the almost irreversibility of tattoos, there has been a notable expansion in the industry and related markets such as tattoo aftercare in recent years. This economic boom signifies a broader appeal of tattoos beyond traditional enthusiasts. Indeed, as of 2023, a third of Americans have at least one tattoo. This trend is particularly noticeable among those under 45 and women, many of whom are entering the job market or facing relatively low wages. Hence, the question arises: why do people want tattoos? The paper discusses three motivations for getting tattoos: enhancing self-esteem, signaling status or wealth, and participation in body modification communities. The paper also aims to better understand the trends in the booming tattoo industry, such as whether the number of visible and non-visible tattoos is growing at the same rate, and how much of the revenue increase is attributable to tattoo removal. This study utilizes cross-disciplinary literature review and data analysis to explore tattoo trends and the reasons behind them.

162

Phi Theta Kappa Alpha Delta Gamma Chapter- research on the economics of play- How can we all benefit from fun?

Gonzalez J[1], **Hancock S**[1]
[1]Suffolk County Community College

Afternoon Oral Presentation-3, Sagtikos 123, April 26, 2024, 1:45 PM - 2:45 PM

Joseph Gonzalez and Sean Hancock will present their Phi Theta Kappa Honors in Action research on “The economics of play” and their findings on the positive psychological benefits of club and activity participation while also engaging in college academics. It’s not just about a balanced existence in our frequently fast-paced and disjointed and fracturing social fabric. Our research delves into the concept of “play” in the context of higher education, examining how engagement in extracurricular activities, clubs, and informal play contributes to the personal and professional development of college students. Through a comprehensive analysis of existing research and empirical data, the study highlights how these recreational activities not only provide an escape from academic pressures but also serve as essential components for enhancing social skills, leadership qualities, and overall improvement in performance.

PTK had to ask themselves one question, “why is club participation declining if the benefits are a net positive? And what should we do about it?”. PTK Alpha Delta Gamma chapter will begin an awareness campaign. We will tell the story of the work, our approach, and our goals for the project. This presentation is not just a rehash of Robert Putnam’s “Bowling Alone”, reflecting on the fraying of the social fabric on a community college level. This is a call to action in our community colleges. We say- “get involved”, and here’s why. Let’s have a lively discussion about being more involved, and understanding the barriers to it, and hopefully, we will all leave motivated to spread the words “have fun”.

186

Beyond Walls: Older Adult Centers as Community Hubs

Spensieri C[1]
[1]NA

Afternoon Oral Presentation-3, Sagtikos 123, April 26, 2024, 1:45 PM - 2:45 PM

A literature review and architectural design revamp the free, public daytime older adult center to foster a stronger, more vibrant community and to enhance the quality of life for older adults. This case study is located at the site of the now-demolished Middletown State Homeopathic Hospital (1874) of Middletown, New York. Our group wrote a 30-page literature review. The literature review discusses contemporary scholarly research on the following topics: urban planning, architecture, landscape architecture, geriatric healthcare, public health, mental health, and more. Through the research, we learned that: there is a lack of affordable older adult housing; most older adults wish to age in place; older adults wish to live at home with autonomy, in a minimally restrictive environment; many older adults lack support systems and feel isolated; middle- and lower-income older adults and their caretakers MacGyver housing and healthcare solutions, but they are not sustainable; and that public, shared older adult centers are the more environmentally-friendly option. The literature review provides evidence to support our architectural design of a free, public daytime older adult center. All existing structures surrounding the site will remain intact. The Older Adult Center has been thoughtfully integrated into the existing site and enhances it. Our design promotes accessibility, inclusivity, and social engagement for all. Our work consists of a literature review, a 2D floor plan, 3D renderings created on Revit, a Google Slides presentation, and a speech. Our concept of a free, public daytime older adult center could have a positive effect not just on Middletown, but on many communities across the United States, and could contribute to a more age-friendly society.

270

Synthesis and Methodology of Novel Polymeric Materials

Dewanamuni U[1]
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Afternoon Oral Presentation- 2, Sagtikos Theatre, April 26, 2024, 1:45 PM - 2:45 PM

Small molecule cyclobutanes are widely used in medicinal chemistry as neuroprotective, anti-inflammatory, and anti-cancer agents. As such, their polymeric counterparts have gained increasing interest. Cyclobutane polymers (CBPs) can be synthesized via either solid-state or solution-state [2+2] photocycloadditions. In our studies, we report an improved and efficient synthetic method to prepare well-defined, structurally complex cyclobutane polymers via a thioxanthone sensitized solution state [2+2] photopolymerization. We observed increased molecular weight and dispersity control with the use of continuous flow.

Hyaluronic Acid (HA) is a linear polysaccharide composed of repeating glucuronic acid and N-acetyl-glucosamine units linked via alternating β-(1→4) and β-(1→3) glycosidic bonds. HA is commonly extracted from biological sources; however, naturally sourced HA results in highly dispersed structural mixtures. Highly dispersed HA leads to batch-to-batch variation when used therapeutically. Specifically, HA is used as a cancer therapeutic due to its binding specificity for the transmembrane receptor, CD44, which is upregulated on cancer cells and is involved in cell division and angiogenesis. Here we report our proposed synthesis of a hyaluronic acid derivative through a series of selective protections and deprotections. The successful synthesis of a hyaluronic acid derivative and its potential for use in cancer treatments shows promise for future research.

80

Numerical Solution for Kinematics of Multi-bar Mechanisms Using Computer Simulations for Education

Torres B[1]
[1]SUNY New Paltz

Afternoon Oral Presentation- 4, Sagtikos 145, April 26, 2024, 3:00 PM - 4:00 PM

A method is presented to demonstrate the application of computer simulations in the kinematic analysis of planar mechanisms, emphasizing its use in teaching the latter topic in a corresponding undergraduate course. Concepts of rigid-body dynamics are utilized in the kinematics of machines to analyze the motions (and forces in dynamics) transmitted within multiple interconnected links that make a mechanism, such as a car engine, airplane landing gear, press machine, door closer, and so on. Due to the tediousness of the analytical solutions, most textbooks limit the derivation of the equations to four-bar linkages like crank-rocker and crank-slider mechanisms. Benefiting from the advancements in computer programs, such as MATLAB, and their efficiency in solving large systems of linear and nonlinear equations, a method is proposed to facilitate teaching kinematic analysis of multi-bar linkages to undergraduate students while fostering the application of computational engineering via real-life examples. The results obtained from this method are shown to be in excellent agreement with the algebraic solution of the relative motion equations for each element in the mechanism. This method is implemented in a stand-alone visual program to facilitate the kinematics analysis of multi-bar linkages in the classroom.

105

Numerical Computations of Advanced Water-Cooled Cold Plates for Thermal Management of Microchips with Hotspots

Selvaggio M, **Rosenfield E**
[1]SUNY New Paltz

Afternoon Oral Presentation- 5, Sagtikos Theatre, April 26, 2024, 3:00 PM - 4:00 PM

High-performance computing is at the core of technological advancements of the modern era. Everything from a simple search on Google to the design, manufacturing, control, and communication with spacecraft relies on millions of computations in a fraction of a second. This non-stop demand for more computational power comes at the cost of overheating the microchips that make the brains of the computers as well as nonuniform temperature distribution. In other words, the reliability of computers decreases, and they have a shorter lifespan. Traditional methods, such as air cooling, are not adequate to remedy the thermal issues of the microchips. Benefitting from the convection heat transfer of liquids, like water, cold plates are used to achieve efficient thermal management of high-performance computers with localized regions of high temperature (hotspots.) The challenge is to balance the improved heat transfer rate from the microchip with the required hydraulic cost (pump power) for liquid flow within the cold plate. In this study, the effect of the internal structure of the cold plate on its thermal and hydraulic performance is examined using finite element methods (FEA) commercial software, COMSOL. Hybrid cold plates with pin-fins concentrated on the hotspot achieve better thermal performance than conventional straight-channel cold plates. However, this is met with increased required pump power.

106

Characterization of 3D-printed Cold Plates for Efficient Heat Removal

Rosenfield E[1], Selvaggio M[1]
[1]SUNY New Paltz

Afternoon Oral Presentation- 5, Sagtikos Theatre, April 26, 2024, 3:00 PM - 4:00 PM

As the ever-increasing power consumption of advanced integrated circuit (IC) chips pose tremendous challenges in managing the chip temperature and the resulting impact on chip performance and reliability, research on novel cold plate design for efficient chip cooling has gained significant interest and traction in the past decade or so. A cold plate is a structure attached to an IC chip or packaging, where liquid coolant (e.g. water) flows through its internal channels and dissipates the heat away from the chip in operation. Typical cold plate designs comprise parallel straight channels in an enclosed cavity, and they are fabricated by conventional manufacturing process such as casting or machining. In this research project, we investigate how the cold plate cooling efficiency can be improved by modifying the internal channels, leveraging the capability of 3D metal printing technology in fabricating internal structures within the enclosed cold plate cavity. Also, a measurement system was developed to experimentally characterize the cooling efficiency of different cold plate structures. Combined with numerical simulations of the cold plate performance, the effect of several cold plate design parameters on the cooling efficiency can be studied for further design optimization. In this presentation, we will introduce the cold plate design considerations and fabrication process, the experimental setup, and provide the latest update on the measurements. Future plans for efficient removal of local hot spots in IC chips will be discussed.

125

Learning to Code: Building Webpages for New Horizons

Turcios K, **Roberts K**
[1]SUNY Old Westbury

Afternoon Oral Presentation- 4, Sagtikos 145, April 26, 2024, 3:00 PM - 4:00 PM

In this research, I explore the transformative power of learning to code, particularly in the context of transferring ideas and creativity across various fields. I demonstrate how learning just ten fundamental commands of HTML (Hyper Text Markup Language) empowered me to construct my own webpage and seamlessly adapt it to different domains.

Through the exploration of essential HTML commands such as link, image, table, colors, font, form, input, list, paragraph, and marquee, I showcase how even novice coders can create and customize web content with ease. Furthermore, I introduce the 7×2C criteria—a framework encompassing Content and Context, Correctness and Credibility, Currency and Continuity, Consistency and Conciseness, Community and Customization, and Compelling and Creativity—to evaluate the quality of webpages effectively.

This study not only equips users with practical coding skills but also illustrates the significance of web hosting in disseminating innovative ideas across diverse fields. By following this research, individuals can confidently navigate the digital landscape and contribute meaningfully to emerging domains.

146

Preparing Students for the AI Era: The Importance of Learning Information Systems

Henderson K, **Abbas M**, **Cespie J**
[1]Old Westbury

Afternoon Oral Presentation- 4, Sagtikos 145, April 26, 2024, 3:00 PM - 4:00 PM

This research explores personal experiences regarding crucial information systems topics that every student should grasp during their time in college. Information systems play a vital role in collecting, organizing, analyzing, and disseminating information to foster knowledge. Among these systems are Management Learning Systems (LMS) like Brightspace, Banner, Navigator, webpages, various software applications, and generative AI.

Key topics in information systems explored in this research include ethics, privacy, security, programming, and web-source code. With the current rise of artificial intelligence in our lives, particularly in education, it becomes increasingly important to understand its nature and how to utilize it effectively. This research suggests methods to enhance preparedness by incorporating concepts from information systems related to AI. Examples such as database construction, webpage replication, and sample search engine programming will serve to illustrate this journey.

Poster Session Abstracts

Morning Sessions

Motor Adaptation and Fatigue in Repetitive Movement Tasks

Storm Gagne[1]
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Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

When people perform a repeated movement task, neuromuscular adaptation occurs that trains the brain to become better at performing the movement. Other phenomena, such as fatigue, can hinder performance, but can also be part of neuromuscular learning. We are collecting movement data to determine these changes in task performance and quantify neuroplastic dynamics during learning. Using a human-machine interface (HMI) that consists of an instrumented isometric joystick that collects wrist movement data, and a custom user interface (UI), data were collected from cursor movements along with electroencephalogram (EEG) and electromyogram (EMG) data. During tasks, participant movements were randomly perturbed using neuromuscular electrical stimulation (NMES) to disrupt the task. To analyze these data, movements were separated into three classes that each subject had to perform: 1) a wrist flexion task where the subject had to flex their wrist to cause cursor movement to hit a target, 2) a wrist extension task where the subject had to extend their wrist, and 3) an alternating task where the participant switched between flexion and extension. In order to determine adaptation or fatigue of the subjects, we hypothesized that cursor oscillation would be indicative of neuroplastic adaptation (i.e., rigidity or contraction in the movement). The magnitudes of each oscillation were determined as the individual reached a target area, and the averages for portions of the task were determined. It was found that across subjects, the oscillation magnitudes tended to decrease in the first 30-50% of each task, while they would increase again at around 80-90% completion. For example, in the flexion task of a particular subject, the minimum average oscillation occurred at the 50% segment, at 44.4074 pixels, while they later hit their maximum at the 90% segment at 145.064 pixels. Overall, this shows that cursor oscillations can indicate adaptation to a task while also being limited by fatigue. This is applicable in medical diagnoses in cases that require quantifiable progress tracking, such as spinal cord injury and post-stroke rehabilitation.

BrockportGPT: A Chatbot for SUNY Brockport

Matthew Saad[1]
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Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

We develop BrockportGPT, an advanced chatbot designed to serve the SUNY Brockport community. BrockportGPT embodies the integration of cutting-edge Large Language Models (LLMs), incorporating methods such as Retrieval Augmented Generation (RAG) and innovative fine-tuning techniques, alongside the development of a from-scratch transformer model. Central to its design is the improvement of text retrieval capabilities and the incorporation of question-topic classification mechanisms, enabling precise and relevant responses to a wide array of inquiries ranging from campus life to academic resources, and more. The foundation of BrockportGPT's development is laid on an extensive data collection process, employing techniques like web scraping and utilizing GPT-4 for the creation of a tailored question-answer dataset. This dataset plays a crucial role in training and fine-tuning the model to meet specific user needs effectively.
Early outcomes of this project indicate a promising approach to enhance university-level information dissemination, underscoring the transformative potential of conversational AI within educational environments. Moreover, BrockportGPT's development process illuminates critical ethical considerations around misinformation necessary for responsible AI deployment. By showcasing the application of LLMs to improve the spread of university-related information, BrockportGPT not only serves its immediate community but also sets a precedent for future explorations in the domain of educational AI applications.

Using Machine learning to improve sorting algorithms

Moses Gilbert[1], **Aakash Saini**[1], Mohamed Khalefa[1]
[1]SUNY Old Westbury

Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

Sorting Algorithms are one of the classical topics in computer science. They highlight different approaches with different tradeoffs; solving a well-defined problem. Sorting is used in various applications, including organizing the data, building indexes, and joining data. Comparison-based sorting algorithms such as merge sort, these algorithms compare items pairwise, are bounded by lower bound by (log (n !)). However, these algorithms are agonist to the data, meaning the algorithm does not use the distribution of the data to speed up the computations. On other hand, other sorting algorithms like radix and bucket sorting assume the data is within a pre-defined range. Therefore, they can achieve a better running time, specifically, linear running time. Instead of pairwise items, these algorithms predict the positions of the items, by computing a simple function. However, these algorithms may require multiple passes over the input to finally sort the input collection.

To this end, by using machine learning, we can build accurate date models for the input, and using the data models to efficiently predict the final locations of items in the output, without requiring multiple passes on the input. A similar approach has recently been proposed in the literature. But we are proposing a different approach to build the data mode, and we aim to support more complex data types, including strings and Json. We will run extensive experimental analysis to compare the proposed approach with the state of the art. We will provide a C++ library, that is publicly accessible with our benchmarks and the results.

The Mediating Impact of Support on the Relationship Between Parental Stability and Later Well-Being

Ms. Taylor Purvin[1]
[1]Farmingdale State College

Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

The impact of parental instability on well-being is a widely studied construct. Research has established that, when considering the relationship between parental conflict and later outcome, social support systems can play an important role. Many studies have focused on the role of sibling relationships in overall adjustment to instability. Our research aims to understand the relationship between quality of sibling relationships and measures of well-being and adjustment (i.e., coping styles, later self-esteem, and locus of control) in situations of parental conflict. Data was collected through a Qualtrics survey at a mid-sized state college in NY and analyzed in SPSS. We hypothesize that greater parental conflict is related to poorer coping and self-esteem and greater external locus of control. We also hypothesize that greater quality of sibling relationships would be related to greater coping, self-esteem and internal locus of control. Furthermore, when considering the mediating role of sibling relationships in situations of parental conflict, we expect a positive impact on the measures of well-being. Preliminary results reveal correlations between parental conflict factors (i.e., coping efficiency, self-blame, frequency, and resolution) and one's coping styles, and internal and external locus of control. Self-esteem does not seem to contribute the overall model. Additionally, findings indicate a relationship between the level of commitment to siblings and one's coping styles, self-esteem, and internal and external locus of control. Further analyses will be conducted to specifically consider parental marital status and exposure to parental conflict. These findings could be meaningful in understanding the roles of sibling support and the quality of parental relationships in one's adjustment to growing up with parental instability. Such knowledge can provide insight that benefits a child's self-perception, their confidence, and their sense of control during times of parental instability. Ultimately, findings can offer valuable information to family, counselors, educators, and mental health providers who are invested in supporting a child's well-being throughout their development and transition to young adulthood.

The American Eugenics Movement: Influence and Impact on the Global Stage

Ms. Ruby Ahmed[1]
[1]Suffolk County Community College

Morning Poster Session A-2, Fine Arts Lobby, April 26, 2024, 9:15 AM - 10:15 AM

Often, we think of Eugenics stemming from the actions of Nazi Germany during WW2. However, what mainstream information sources often fail to shine a light on is the impact that eugenics had in the United States and the influence that it would have internationally, especially in Germany. What degree of influence, if any, did the American Eugenics Movement have on Nazi Germany's eugenics ideologies and practices? How profound of a connection did these two movements have? Not often viewed in the same regard as Nazi Eugenics, American Eugenics caused almost as much harm by altering the lives of black, immigrant, and special needs men and women in the United States through methods of forced sterilization during the late 19th and early 20th centuries. My interest in this topic and query was heightened through my study of Adolf Hillter's regime and their further radicalization of such aforementioned American practices. This is further proven through evidence of leadership within the Nazi party being sent to the US to study amongst American researchers on Long Island at the Eugenics Record Office (ERO) based in Cold Spring Harbor. Through the use of primary and secondary sources, my research delves into the history of American Eugenics to gather a clearer understanding of the movement's outcomes and consequences, as well as its influence and impact on the more widely-recognized Nazi Eugenics Movement. In addition, my research follows the cultural markers within society that were often tied to economic and social struggles. These struggles provided fuel for the eugenic movements and the political pressure to maintain them.

SIR Model for Infectious Diseases

Mr. Evan Hayes[1], **Sean Burns**[1], **Khadia Jenkins**[1], **Geneve Carbajal**[1]
[1]Farmingdale State College

Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

A differential equations system known as the SIR model is frequently used to analyze the transmission of infectious illnesses. This model divides the population into three categories: susceptible, infected, and removed. In this study we use Matlab Software to simulate infectious rates of historical infectious diseases. We compare our model simulations to historical data of the Hong Kong Flu in 1968, and COVID-19 data from Pinellas Florida and Rockland New York in 2020.

Optimizing the k-Nearest Neighbors Algorithm for Bank Churn Prediction

Sonia Akakpo[1], Mr. Patrick Dambra[1], Ms. Rachell Paz[1], Timothy Smyth[1], Frank Torre[1]
[1]Farmingdale State College

Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

Bank churn occurs when customers switch from one bank to another. Although some customer loss is unavoidable, banks must avoid voluntary churn as it is easier and cheaper to keep an existing customer than gain a new one. On average, it costs a bank roughly $500.00 to recruit new members. In our paper, we train and optimize a machine learning algorithm, specifically a k-nearest neighbors algorithm (KNN), to predict whether or not a customer will leave the bank using existing demographic and financial information. By giving banks a reliable method for predicting whether or not a customer will churn, they can prioritize certain groups to increase retention rates. Our experiment uses a dataset taken from Kaggle. We compare the accuracy of our algorithm to other types of machine learning algorithms. The experiment compares our optimized KNN algorithm to random forest and logistic regression models. Our paper aims to increase the accuracy of the k-nearest neighbor algorithm by optimizing the k value used in our model. Our optimization technique includes ranking and weighing the most important attributes, and utilizing k-folds cross-validation. After optimizing this model, we can input a single customer's data to predict with 82% accuracy whether or not the customer will churn.

Analyzing performance of equity index universal life insurance with dynamic stochastic models

Ms. Valentina Colon[1], **Sabrina D'Aulisa**[1], **Darren Dawson**[1]
[1]Farmingdale State College

Morning Poster Session A-2, Fine Arts Lobby, April 26, 2024, 9:15 AM - 10:15 AM

In this project, we will analyze the cash flow, return and risk, protection value, and tax advantages of equity-based index universal life insurance, both as a life insurance policy and as an investment vehicle. Most of the current literature and business reviews on this topic are simply based on historical data like the S&P 500 index. We plan to do comparisons not only based on historical data but also with dynamic stochastic models. We also will do a case study comparing the S&P 500 investment fund to the equity-based indexed universal life insurance. Classical statistical methods like Monte Carlo simulation will be implemented. Using the Monte Carlo simulation we will predict future values to calculate whether investing in the S&P 500 or purchasing an Indexed Universal Life is better by trying to find out which option maximizes return. Analyzing possible outcomes allows us to see the advantages and disadvantages of investing in the S&P 500 as well as the Indexed Universal Life Insurance Policy.

Age Moderates the Relationship Between IQ and Facial Emotion Recognition at Low But Not High Levels of Autism Feature Levels

Julia Wygand[1]
[1]Farmingdale State College

Morning Poster Session A-2, Fine Arts Lobby, April 26, 2024, 9:15 AM - 10:15 AM

Individuals with Autism Spectrum Disorder (ASD) experience deficits in the processing of facial information (Behrmann et al., 2006). However, there have been mixed findings regarding facial emotion recognition (FER) abilities of autistic youth. An interpretation of these mixed findings is that there may be individual differences in the ability to develop and use compensatory response strategies. The aim of the present study was to delineate the relationship between IQ and own-age FER abilities for adolescents as a function of age and ASD feature levels. To investigate this relationship, one hundred and forty-seven adolescents completed a standardized FER task. IQ was assessed using the Kaufman Brief Intelligence Test-2 (KBIT-2; Kaufman & Kaufman, 2004). ASD feature level was determined using the Autism Diagnostic Observation Schedule-2 Severity Score (ADOS-2; Lord et al., 2012). Results indicated that age moderated the relationship between IQ and errors in child FER, but only at low ASD feature levels. At moderate and high ASD feature levels, IQ significantly predicted own-age FER errors, regardless of participant age. Overall, results suggest that cognitive ability may only relate to behavioral performance on FER tasks until a level of developmental expertise is achieved for autistic youth. Additionally, individuals with moderate and high ASD feature levels may not reach this typical level of expertise, and may rely on using compensatory response strategies throughout later adolescence.

“The Role of Politics in Facilitating Human Happiness”

Mr. Josiah Farrell[1]
[1]Westchester Community College

Morning Poster Session A-2, Fine Arts Lobby, April 26, 2024, 9:15 AM - 10:15 AM

Happiness is rarely mentioned when political issues are discussed. However, governments and political organizations can play a very important role in facilitating happy societies. This presentation will focus on several important initiatives launched by the United Nations to promote global wellbeing. It will highlight the objectives and impact of the International Day of Happiness as well as the DEI goals underlining the Happy Schools Project spearheaded by UNESCO. One main segment of the presentation will be devoted to the annual World Happiness Report – the criteria used for ranking, the reasons why some countries consistently place the highest, and the problematic position of the United States on the scale, including its drop in ranking from #15 in 2023 to #23 in 2024. Lastly, the presentation will review several initiatives executed by individual governments, with specific focus on the innovative tool of the Gross National Happiness Index pioneered by the country of Bhutan. This presentation aims to demonstrate that global and national policies and initiatives implemented with people’s happiness in mind are an important new trend in the 21st century.

Instructions for Virtual Reality Based on Cognitive Load Theory

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Morning Poster Session A-2, Fine Arts Lobby, April 26, 2024, 9:15 AM - 10:15 AM

My research focused on how to design a student instruction protocol for Virtual Reality (VR) technology to reduce student cognitive overload. I wanted to develop a procedure that wouldn't overwhelm a student's working memory when using VR technology. I worked with College Head Librarian Dana Antonucci-Durgan and Professor Yu Zhang to create VR instructions as part of a SUNY IITG project to investigate the use of VR drawing programs in general chemistry instruction. In this study, I created instructions for VR based on John Sweller's Cognitive Load Theory. The study employed the process of design-based research where I used an iterative process to refine a set of instructions for the VR Lab that is in the Suffolk Community College Eastern Campus Library. This protocol of instructions consisted of physically putting on the VR headset and turning on the controllers, getting into the simulation drawing program Tilt Brush, and navigating around in the simulation. An iterative design was used to build my instructions for the framework of this study. I ran a trial each time I refined the set of instructions to measure and record the procedural time. I concluded that the more time it took, the more cognitive overload occurred. I found that breaking down the instructions into smaller parts while using both colored pictures and simplified texts took less time. Those set of instructions reduced visual overstimulation as well. By designing a simplified procedure for VR that utilizes colored images, will help reduce cognitive overload in students.

What do Transfer Students have to Say? An Analysis of the Experience of Transfer Students through Topic Modeling

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Morning Poster Session A-2, Fine Arts Lobby, April 26, 2024, 9:15 AM - 10:15 AM

In recent years, there has been a notable rise in an alternative route to achieving higher education: a growing number of students are transitioning from 2-year colleges to 4-year institutions to complete their undergraduate degrees. Transfer students are a minority among the 4-year institution student population, many being first-generation, low-income, and racial minorities. To understand how to assist these underrepresented students, the question is: what are the most significant factors influencing the decision to attend a 2-year institution and transfer instead of immediately attending a 4-year institution? An online survey, which was anonymous and confidential, of 161 students in computing majors provides invaluable information about the transfer process for underrepresented students. This paper analyzed the demographic information along with the five open-ended questions asked to the participants of the survey. Participants' responses reveal the influence of their families, social media, and advisors and how aspects of their identity have affected their decisions. To gain a deeper understanding of this data, NLTK and Pandas libraries are used to clean the data, WordCloud library is used to generate word clouds and three topic modeling algorithms including unsupervised (i.e., Latent Dirichlet Allocation (LDA)), semi-supervised (i.e., Correlation Explanation (CorEx)), and pre-trained (i.e., Bidirectional Encoder Representations from Transformers (BERTopic)) models are used to identify critical issues regarding students' transfer decision. Responses are first cleaned, aggregated, and visualized into word clouds; separate word clouds are generated for each question to reveal critical factors. With the aggregated analysis of word clouds and topic-modeling results, it becomes evident that cost, career opportunities, financial aid, distance from home, and guidance from family are the key factors influencing the decision between 2-year and 4-year institutions. The biggest challenges in the participants' transition were transferring credits, difficult classes, working while attending school and overall adjusting to a 4-year institution. These findings can be used to help transfer students succeed in their 4-year institution and beyond in their careers.

The Analysis of Large Language Model Performance in Big Data Analytics

Liam Davies

Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

This research project aims to leverage large language models (LLMs) for big data analytics in assistance of addressing critical questions in data science. Its primary objective is to evaluate how effective current LLMs are in the data analysis process compared to prevalent conventional machine learning methods. The project builds upon an ongoing independent study where we are measuring malware prediction accuracy within a dataset of network traffic logs. This encompasses extensive Python programming utilizing libraries such as NumPy, Matplotlib, and pandas for data manipulation and preprocessing. Additionally, it incorporates diverse LLMs and embedding models including those from OpenAI and Hugging Face, alongside complementary Python libraries like PandasAI for demonstrating the power LLMs in comprehensive data visualization. As progress is made in the study, other datasets may be used in the testing of these models through many examples and contexts. Through this process, we aim to shed light on the effectiveness of LLMs in data analysis and to provide insights and methodologies that enhance decision-making processes and drive innovation in data science.

“Neurochemical Factors Related to Positive Emotions and Affect”

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Although neurochemical factors do not paint the whole picture of happiness, they do play a very significant role. If a person’s hormone levels are well balanced, they are more likely to experience positive emotions. Imbalances in hormone levels can lead to depression. This presentation will focus on the effects of hormones such as dopamine, oxytocin, estrogens and androgens (esp. testosterone) as well as serotonin on a person’s mood fluctuation. The audience will learn practical tips on how to improve hormone production through exercise (dopamine, serotonin, testosterone), sleep (dopamine, testosterone), diet (dopamine, serotonin, testosterone, oxytocin), listening to music (dopamine, oxytocin), meditation (dopamine) and Vitamin D intake (dopamine, serotonin, estrogen). The presentation will also include a brief review of the parts of the brain that are implicated in happiness and emotion processing: Dorsolateral prefrontal cortex (dlPFC), Orbitofrontal cortex (OFC), Anterior consulate cortex (ACC), and Amygdala. The main objective of this presentation is to raise awareness regarding the impact of physiological factors on a person’s mental and emotional health.

Age Moderates the Relationship Between IQ and Facial Emotion Recognition at Low Feature Levels of Autism Spectrum Disorder

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Typically, individuals develop their facial emotion recognition abilities to their full potential by late adolescence. However, individuals with Autism Spectrum Disorder face difficulties regarding facial emotion recognition. Based on this knowledge, we hypothesized that participant age would moderate the relationship between IQ and own-age facial emotion recognition abilities. It was further hypothesized that the moderation effect of age on the relationship between IQ and own-age facial emotion recognition abilities would be moderated by the participants' ASD feature levels. In this study, 147 participants (113 with ASD; 34 without ASD) completed the Diagnostic Analysis of Nonverbal Accuracy (DANVA-2) task, Kaufman Brief Intelligence Test (KBIT-2), and the Autism Diagnostic Observation Schedule (ADOS-2) to evaluate their facial emotion recognition abilities, IQ, and ASD feature levels respectively. After determining the errors in facial emotion recognition, participant IQ, ASD feature levels, and grouping the data based on participant age (early, middle, and late adolescence), results supported a relationship between IQ and own-age FER although there was no significance across the full sample when accounting for the impact of age on this relationship. However, support for a three-way interaction was found when ASD feature level was taken into account. This suggests that cognitive ability only relates to FER task performance up to a certain point in the development of autistic individuals.

Using Logistic Regression to predict student learning performance at an early stage

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Predicting student performance is an extremely important step in education in order to identify at-risk students and to provide them with the help they need right away. This early detection of students who may be likely to fail can help teachers and educators take proactive measurements to support these types of students and improve their likelihood to succeed. The goal of this research is to explore AI/ML techniques to build a model to evaluate the learning performance of students who are taking entry level programming courses. We gathered the grade history of over 150 students over the past two years. This history consists of homework completion, quiz scores, and exam scores. Since our goal is to identify a student's risk of failing early on, we filtered out the data in the latter half of the semester, only keeping data up to the midterm. To simplify the processing, we manually assigned weights to homework, quizzes, and exams, then merged them into one feature. We chose logistic regression due to the fact it is particularly advantageous when looking to perform binary classification. It provides probabilities for two value outcomes, which is the measure of confidence in prediction. In this study, this would be the likelihood of a particular student passing or failing. We split out data into two subsets, 80% of the data will be used for training and the other 20% for testing. Training and testing the model on these two subsets, we have achieved 87% accuracy with a loss function value of 0.269, which is aspiring. With AI techniques, we hope we can accurately predict the possibility a student may fail and take actions so as to improve teaching and learning at an early stage. In future we will continue to refine the model by finding a math solution to automatically weight multiple features in the records and explore new models for more accurate prediction.

Native American Arrowhead Classifier: Using Deep Learning Techniques

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Native American projectile points vary over time and geography with cultures developing technological novelties based on their specific environment/use and advancements in tool making. Identifying specific points can help archeologists determine the timing of habitation in an area as well as understand cultural networks. Using deep learning, this image classifier utilizes a convolutional neural network (CNN) architecture implemented with TensorFlow. The CNN model employs transfer learning with the pre-trained VGG16 architecture on the ImageNet dataset. The CNN extracts features from arrowhead images using convolutional layers with learnable filters that detect patterns, edges, and shapes. The output from these layers is passed through pooling layers, which downsample the feature maps by taking the maximum or average value within a specified window size. This allows the model to retain important information, lower computational complexity, and improve recognition of arrowheads regardless of their location within the image. The pre-trained VGG16 model's output is flattened and fed into a set of dense layers with regularization techniques such as L2 regularization and dropout to prevent overfitting. The final layer uses the softmax activation function to output class probabilities for each arrowhead type. During the training process, the model adjusts the weights of these layers using stochastic gradient descent (SGD) and backpropagation to minimize loss. Optimization involves iterative forward and backward passes through the network while scaling the weights. The initial layers of the pre-trained model, which captures generic features, are frozen, while the later layers are unfrozen and retrained using a lower learning rate. This allows the model to use the knowledge gained from the ImageNet dataset while tailoring the final layers to the unique characteristics of Native American arrowheads. Fine-tuning the model is essential when using transfer learning to allow it to adapt to the different use cases of our project. Currently, the model has a 73% accuracy with a 60% validation accuracy although not currently desirable we hope to further improve this with larger data sets, as well as testing different methods.

Using Neural Networks to Predict Chaotic Behavior in the Classical Kicked Rotor Model

Anik Schorer

Morning Poster Session A-1, Sagtikos Lobby 1st floor, April 26, 2024, 9:15 AM - 10:15 AM

Finding equations to predict chaotic systems is very difficult due to their complex and nonlinear nature. In this research, we investigate an alternate approach, the use of neural networks to predict chaos, specifically in the classical kicked rotor system. The classical kicked rotor system is a fundamental system for studying chaos in dynamical systems. To start, the classical kicked rotor system is first implemented in Python. Whether a trajectory is chaotic is determined using Lyapunov exponents, a metric that quantifies the rate of divergence or convergence of nearby trajectories in a dynamical system. The kick strength, initial angular position, and initial momentum are fed into the neural network and it predicts a chaotic or periodic trajectory, using a binary classification. This is a continuing project and will next be applied to the quantum kicked rotor system.

Monitoring of Thiamine Deficiency in Lake Ontario Steelhead Trout

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Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

Thiamine deficiency complex (TDC) has been documented in salmonine species from the Great Lakes. In this study, we measured thiamine concentrations in steelhead trout eggs collected at the Salmon River Fish Hatchery between 2015 and 2023. Eggs were also fertilized in 2015, 2016, 2017, 2022, and incubated to determine offspring survival and the lethal concentration that causes 50% of offspring mortality (LC50). A new LC50 was determined at 5.4 nmol/g, lower than the previously estimated concentration. Egg thiamine concentrations significantly varied among years ($p<0.05$). A substantial number of fish (84.5 ± 17.92%) produced eggs below the LC50 across all years. To assess the cause of TDC, we investigated yearly changes in lipid content and fatty acid composition. Lipid content differed among years ($p<0.05$) with the lowest content in 2020 and the highest in 2023. Finally, yearly fatty acid signatures in eggs significantly differed among years ($p<0.05$) and the fatty acids most responsible were 22:6n-3, 18:1n-9, 20:5n-3, and 16:0. Although these results suggest a potential shift in steelhead trout diet, average egg thiamine concentrations were below the LC50 across years and further investigation are required to determine how diet affects thiamine concentration.

Meta-inflammation Increases the Migration and Invasiveness Potential of Prostate Cancer Cells

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Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

Obesity-induced chronic low-grade systemic inflammation, or meta-inflammation, is characterized by the accumulation of immune cells, mainly macrophages, in the adipose tissue (AT) and the deregulation of AT hormones and cytokines. Several studies have suggested that obesity is associated with a higher risk of fatal prostate cancer. Prostate cancer (PCa) represents one of the most common types of cancers diagnosed in American men and the third most common cause of cancer related-deaths, mainly due to incurable metastatic disease. Within the tumor microenvironment, there are several factors that play an important role in the proliferation and metastasis of cancer. Such factors include inflammatory chemokines and cytokines associated with infiltrating macrophages into the tumor environment. These infiltrating macrophages (also known as tumor associated macrophages) are a key component of inflammation during prostate cancer tumorigenesis and metastasis. The underlying mechanisms linking obesity with PCa are not completely understood. The goal of this project is to elucidate the molecular and cellular mechanisms underlying the association of meta-inflammation with prostate cancer migration and invasiveness. We hypothesize that a hypercaloric environment will promote the migration and invasion of PCa cells. To addresses this hypothesis we used U937 human macrophage-like cells and exposed them to a lipid-rich microenvironment to mimic the cellular metabolic inflammation observed in obese AT. After 16-18 hours of stimulation with 300 □M Sodium Palmitate (inflammatory conditions), we collected the conditioned media which was used to stimulate DU145 human prostate cancer cells. The invasive cellular behavior was assessed by transwell migration, Boyden chamber invasion, and wound healing assays and we found that stimulation with conditioned media from inflammatory conditions promoted an increased in cell migration and invasion when compare with unstimulated DU145 cells. Taken together, our findings suggest that meta-inflammation promotes the progression of prostate cancer towards an invasive state.

Inter- and Intramolecular Hydrogen Bonding in n-Octanol Related Ether Alcohols

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Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

We have conducted a molecular dynamics (MD) study investigating the effect of ether position on the hydrogen bonding present in isomeric species of octanol-related ether alcohols. This work was motivated by the need to understand the fundamental interactions in polyethylene glycol (PEG) systems. PEG has garnished significant attention in recent decades due to its role in green chemistry, being a sustainable feedstock demonstrated to have minimal environmental toxicity. Low molar weight PEGs are liquid at room temperature and have been found to be an effective solvent for a wide range of solutes. PEGs have therefore increasingly been successfully used in chemical synthesis, replacing traditional toxic solvents. This study is an ongoing work dedicated to developing a molecular level of understanding of PEG as a chemical solvent, thereby promoting its further use in research and development.
Data extracted from the simulations include physical properties such as density and viscosity that were compared with experimental measurements, as well as values more difficult to obtain experimentally, such as radial distribution functions and number of hydrogen bonds. As one preliminary result, intramolecular hydrogen bonding was found to be most prevalent when the ether moiety is centrally located in the molecular structure of the ether alcohol. We attribute this finding to two effects, namely ring constraints and entropic effects with increased configuration space when the distance between ether and hydroxy moieties becomes larger.

Exploring the Impacts of Urbanization, Climate Change, and Global Socio-Economic Dynamics: A Comparative Study of Nine Developing Nations

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Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

The looming threat of climate change dominates the current era, and developing nations bear a disproportionate burden of its consequences. Over the years, researchers and economists have tried to understand the implications of climate change on the world economy at large. This study explores the relationship between urbanization, climate change, and the aftermath of these abrupt changes in global society and economies. As temperatures rise in all parts of the world, natural disasters become more frequent, resulting in a decline in crop yield in countries heavily dependent on agriculture, leading to an upward trend in urban migration and potential migration outside of the country. The paper delves into nine different countries from South Asia, Southeast Asia, Eastern Africa, and South/Latin America, which have different geographical and socio-economic backgrounds. It also tries to find commonalities in those nations regarding the rapid changes in crop yield and urbanization rate caused by climate change. This paper underscores the geopolitical significance of these regions, their contribution to the global economy through agriculture, and the potential risks of political instability and migration on a global scale. This paper uses data to understand the urbanization trend, crop (cereal) yield, and crop yield compared to population growth. It proposes a potential correlation between climate change and increased urban migration. It supports the hypothesis that these circumstances can result in climate migration out of the affected countries, as well as increased food prices in developed nations and food insecurity worldwide. Developed countries are urged to lead global efforts to reduce emissions, invest in sustainable development, and support international frameworks to combat climate change to protect their own self-interest in those regions and maintain economic and social stability at home. The paper emphasizes the interconnectedness of the world and how spill-over effects of such circumstances affect the developed nations if no steps are taken.

Eulers formula

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An important underlying “transformation” in mathematics is the Euler Formula. It serves as a tool used in Physics, Chemistry, Mathematics, and Engineering to solve complex problems via differential equations, and functional, Fourier, and complex analysis. We see that e^{iθ} = cos(θ) + isin(θ), relates the power function with base e and the trigonometric functions cos(θ) and sin(θ) on the complex plane in one formula. Setting theta to pi leads to what is considered “the most beautiful equation in mathematics” – e^{iπ} + 1 = 0 - the Eulers identity.

The Spatial Abundance of Mollusks Species Through the Tidal Profile at Sunken Meadows State Park Beach.

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Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

Nine different species of Gastropods and Bivalve seashells were surveyed at Sunken Meadows State Park Beach, on the Coastline of the North Shore beach in Suffolk County, New York. A total of nine species were detected from 237 shells surveyed. These mollusks were recorded during the lowest tides in the intertidal zone at Sunken Meadows State Park Beach on October 27th, 2023. This survey was conducted in a total of four tide boxes which were measured toward the tide line with a tape measure and were recorded within the hours of 11:00am and 3:00pm. The goal of this research was to determine whether the Spatial abundance of mollusks species would decrease when I measured toward the tideline.

The results showed that the dominant species were the Common Atlantic Slippersnail (Crepidula fornicata) and the Common Jingle (Anomia simplex). In this survey, I discovered that the Spatial abundance of mollusks decreased when I measured toward the tideline. Also, I observed that majority of the mollusk shells surveyed were native to Long Island; however, they were in smaller quantities as compared to the invasive species including the most dominant species, the Common Atlantic Slippersnail (Crepidula fornicata). This research shows the population decline of Long Island native mollusks species, and the loss of biodiversity this decline poses. It also shows the threat of ecological imbalance because of decreased spatial abundance of these mollusks' species.
This research was motivated by my desire to better understand marine ecosystems, their significance to the world, and how the activities of human beings impact the biodiversity within these ecosystems. The audience will experience a better understanding of diverse marine living organisms and their interactions in the Ocean. They will also have a better understanding of the impact of human activities on these ecosystems.

Recycled Plastic Amended Concrete: A Sustainable and Lightweight Construction Material

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Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Concrete, a globally utilized construction material, is renowned for its versatility and widespread use in construction. It is crucial to balance the proportion of concrete's components: cement, aggregate, and water to ensure structural strength and durability. Recent studies explored an innovative approach to boost concrete sustainability by substituting traditional aggregate with recycled plastic. Therefore, instead of discarding this non-biodegradable plastic waste, it could be utilized in the construction sector. Our research builds upon this foundation, aiming to provide a deeper understanding by focusing on selection of a specific type of plastic and determining the optimal percentage for blending with aggregate that will not only meet but surpass the requirements and expectations of the construction industry. Plastic amended concrete will yield a sustainable construction material. In this experimental research, 6" x 12" cylindrical concrete specimens were manufactured with recycled plastics (polyethylene terephthalate mixed with high density polyethylene). Plastic bottles and containers were collected from recycled bins, cleaned, cut into uniform proportions of ¾ of an inch, and mixed with cement, aggregate and water. Plain concrete samples without plastic were also fabricated for comparison. Properties of fresh concrete were evaluated through slump test, and air content test. Compressive strength test was performed on cylindrical specimens after 7-days of curing. Results obtained from plastic added concrete were comparable to the control plain concrete specimens. Also, plastic amended concrete yielded lower bulk unit weight as compared to control specimens. This cutting-edge research aligns with environmental initiatives, aiming to create an eco-friendly, robust, and lightweight construction material.

Comparative Analysis of Carnot, Simple Rankine, and Reheat Rankine Cycles for Power Generation in Nassau County, New York

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Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

This study presents a comparative analysis of the design and theoretical implementation of three power cycles: Carnot, Simple Rankine, and Reheat Rankine. Aimed at addressing the energy needs of a selected county in New York State, the study explores the conceptualization of a power plant fueled by either natural gas or coal. The project's core motivation is the application of theoretical knowledge to practical scenarios, simulating the real-world process of designing energy systems to meet specific demands. It covers an extensive load estimation, environmental considerations, operational constraints, parametric studies for optimization, and a detailed cost and benefit analysis over a 20-year period. Through this project, students are introduced to the complexities of thermal system design with regard to real-world applications and challenges.

Investigating the Influence of Electrode Geometries on Electrolysis for Coral Biomineralization

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This independent study focuses on understanding the influence of electrode geometry on electrolysis and their impacts on the biomineralization processes of tropical and subtropical corals. Biomineralization investigates the study of processes that lead to the formation of structured organic-inorganic materials within living organisms, including shells, bones, and teeth. Biomineralization is pivotal for the growth, health and development of coral skeletons. Electrolysis provides for a chemical alteration by means of electrical current passing through the substance. In this case, it is desired to have decomposition of one electrode and biomineralization of calcium carbonate on the other electrode, which is critical for the bone structure of the coral to promote growth and strength of the reefs. Changing electrode geometries result in different outcomes in the electrolysis process. Through the use of COMSOL the varying geometrical effects on the electrolysis process is modeled and experimented with. Using COMSOL's Electrical Currents module and setting up parameters specifically tailored for this application is vital in exploring the optimum desired electrode geometry. Understanding the correlation between current density and calcium deposition is crucial for optimizing electrolysis conditions. Current density is directly related to the electrode geometry thus, a systematic parametric analysis was conducted to comprehensively explore this impact. This study aims to figure out which electrode geometries work best for electrodeposition, or if it does not matter. Uncovering insights into the specific factors that affect the efficiency of electrolysis are crucial in enhancing coral biomineralization.

The Impact of Tetrahydrocannabinol on Neonatal Skeletal Development

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The rapid expansion of legalized marijuana has been accompanied by an increase in the number of people using this drug. Clinical studies have reported that users of marijuana have an increased incidence of skeletal fractures and decreased bone mineral density where 2-5% of women use marijuana regularly during their pregnancies. Tetrahydrocannabinol (THC) is the primary psychoactive component in marijuana and can cross the placental barrier and potentially affect fetal development. Currently, nothing is known about the effects of prenatal THC exposure on skeletal development. Therefore, we conducted a study in which rats were prenatally exposed to THC. Rat dams were exposed to THC (0.8mg/kg) via inhalation or normal air daily from 3 days prior to pairing for breeding until they gave birth. This dose results in peak THC blood plasma levels of 71.6 +/- 10.9 ng/mL which is similar to the clinical levels detectable after smoking marijuana. The pups were then euthanized on postnatal day 60, corresponding to the end of adolescence in humans. Digital caliper measurements with a “Manostat” Caliper were taken to ascertain tibial and femoral length and mid-diaphyseal diameter on the anterior-posterior (AP) and medial lateral axes (ML). Biomechanical analysis was performed by subjecting femora to 3-point bending tests to determine energy to failure, stiffness, ultimate force, failure force, and yield force. Results were compared between THC and normal air (control) within the male and female cohorts. Sample sizes were 8 for each group. Significance was determined by a two-way ANOVA with Tukey’s multiple comparisons tests. Caliper measurements with significant differences were found between the control group and the group exposed to THC for tibial ML diameter in both males and females. Specifically, tibial ML diameter was 57% wider in male controls compared to THC exposed and 29% wider in the female controls compared to THC along with femoral length in females was 4% longer in controls compared to THC. Biomechanically, only male femoral yield force differed significantly, with THC exposure resulting in a 28% increase compared to control. The completion of these studies will provide us with a better understanding of the effects of prenatal THC exposure on skeletal development.

Food Preference and Reinforcer Assessments with Three Chickens (Gallus Gallus Domesticus)

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The purpose of this study is to change food preferences in chickens. It is important for people to be able to change chickens' food preferences because climate change may result in the scarcity of certain foods that chickens normally consume. The researcher conducted habituation procedures, preference assessments, stimulus shaping procedures, reinforcer assessments and response shaping procedures with three female chickens (Gallus Gallus Domesticus). Habituation procedures were conducted by holding the chickens and feeding them out of a measuring cup. Once the chickens consistently ate out of the cup while simultaneously being held, 10-minute free operant preference assessments were conducted to assess the chickens' most and least preferred foods. Then, a stimulus shaping procedure was implemented to increase the chickens' eating food from the cup when delivered by the researcher. The proximity of the food cup (i.e., from near to far) to the chicken was increased incrementally prior to the chicken eating from the cup. In the next phase, a reinforcer assessment will be conducted where the chickens will be assessed on how much behavior they will engage in for the most and least preferred food items. The study is still in the exploratory phase and data collection is currently ongoing.

Using a plant-derived auxin inducible degron for depletion of Pol32 during budding yeast meiosis

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DNA polymerase delta, a highly conserved polymerase among eukaryotes, has been shown to be involved in DNA replication and various types of repair. In Saccharomyces cerevisiae (budding yeast), the DNA polymerase delta complex consists of three subunits, which includes a non-essential subunit, POL32. In vegetative cells, DNA polymerase delta (including Pol32) is required for chromosomal DNA replication and to repair DNA double-strand breaks (DSBs) in break-induced replication (BIR), a homologous recombination pathway used to repair one-ended DSBs. We hypothesize that POL32 may have a similar role(s) during DNA synthesis and strand extension in meiotic recombination.

Meiosis is a specialized type of cell division, which reduces the chromosome number by half, in the gametes used for sexual reproduction. Programmed DSBs are preferentially repaired between homologous chromosomes, to create crossovers, that mediate proper chromosome segregation during meiosis I. The DSB repair observed during meiosis using the homologous chromosome, as a template requires DNA synthesis, after the invasion of the 3' single stranded ends into the homologous DNA duplex. There are two processes during meiosis that might involve POL32: pre-meiotic DNA replication (S-phase) and meiotic recombination. Our goal is to determine the functional role(s) of Pol32 in yeast meiosis.

Since pol32Δ results in chromosome instability during vegetative growth, a conditional mutant of POL32 was created, by using the plant derived Auxin Inducible Degron (AID) system. There are several advantages to auxin inducible depletion: (1) It allows the study of genes with essential roles and (2) it is a fast and efficient method. With Pol32, this approach was taken in the attempt to prevent any mutations arising from problems during vegetative growth from affecting meiosis. Pol32 will be tagged to the degron (IAA17 transcription repressor) and an SCF E3 ligase component, TIR1. In the presence of auxin, Pol32 will be polyubiquitylated and degraded by the proteasome. Construction of the strain with IAA17-Pol32-TIR1 was carried out and used for meiotic depletion. In this study, we aim to show successful degradation of Pol32 using this AID system.

The Chemokine, CXCL12, Stimulates Migration of Hypothalamic Neurons

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Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

The immune system is a vital component of our body's defense system against pathogens. However, newer research has found that inflammatory mediators have pleiotropic functions that fall outside of the immune system. The inflammatory mediator, CXC motif chemokine ligand 12 (CXCL12), is a chemotactic cytokine (chemokine) that has been shown to be vital for proper organ development in mice. Genetic knockout of CXCL12 is lethal while downregulation of this mediator can cause cardiac and neurological defects1-5. This chemokine has also been found to be tightly coupled to modulating neuronal firing, suggesting its importance in neuronal function and development6,7. Prenatal exposure to CXCL12 is shown to induce hypothalamic neurogenesis, however, the specific processes remain unclear2, 8. The process of neurogenesis entails proliferation, migration, and neuronal differentiation. Due to chemotaxis being a function of CXCL12, we hypothesize that this chemokine will stimulate migratory behavior without affecting proliferation or differentiation. Immortalized embryonic hypothalamic cell lines were treated with 50, 100, and 200 ng/mL CXCL12 and the migration and proliferation rate were measured. We found that CXCL12 dose-dependently increased the migration of hypothalamic neurons over the course of 24 hours and was further confirmed with the use of a □-chemotaxis migration chamber. Isolating CXCI12's impact on each neurogenesis phase will clarify its role in embryogenesis rather than in classic immune functions. Measurements of proliferation also show some change. Continuation of these studies will use RNAseq to determine which gene families are involved in the CXCL12-stimulated neurogenesis events. The results further support the hypothesis that CXCL12 plays a large role on specific neurogenesis events through its primary function of migratory behavior in hypothalamic neurons.

No proliferation. CXCL12 does not affect proliferation

Investigating gene functions in the F1 cluster phage Akhila

Alesha Qureshi[1], **Sophia Yakubov**[1], Alaina Adams-Lud, Tahamina Akter, Ayesha Ansari, Jack Cassidy, Leslie Contreras, Jeniah Crowell, Steven Flores, Gerald Hernandez-Canales, Terrence Holland, Kaitlyn Khalawan, Leah Laufe, John O'Krepkie, Karan Parmar, Sarah Remyes, Christopher Sanchez, Nayeli Vicioso, Dr. Jillian Nissen
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Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

SUNY Old Westbury is a part of the 10th Cohort of the HHMI SEA-PHAGES program, and recently joined the 3rd cohort of the SEA-GENES project in 2021. The phage Akhila was isolated in Fall 2019 as part of the phage discovery component that was integrated into the honors section of Basic Biosciences I Laboratory (BS2401). As this section was switched to a remote format in Fall 2020, students in this course instead annotated Akhila's genome as a part of the SEA-PHAGES Bioinformatics project. Akhila has a Siphoviridae morphotype with a temperate life cycle. It was sequenced at the University of Pittsburgh Bacteriophage Institute using Illumina sequencing with a shotgun coverage of 1484. It has 56,251 base pairs and 62.1% GC content. It belongs to the F1 cluster of Mycobacterium smegmatis mc2155 phages. The final annotation of this phage identified 99 genes, 37 with assigned functions, and 62 with no known function. As the GENES program serves to investigate the function of these phage genes, 86 have been amplified from phage DNA, 43 of which have assigned functions, and 53 with no known function. Of these, 68 were chemically transformed into E. coli and confirmed as the correct gene through clone verification PCR. We are currently performing cytotoxicity and defense assays in M. smegmatis to determine the role of these genes in the phage life cycle.

Empowering Sustainable Transportation with Innovative Infrastructure

Mohammed Kazmi[1], **Ms. Gabriela Carpio**[1], **Ms. Katherine Bonilla**[1], **Susan Ehrler**[1]
[1]Farmingdale State College

Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Our project, undertaken in collaboration with Farmingdale State College, aimed to address the need for a comprehensive transit hub to serve students, faculty, and the wider community. As architects, general managers, and project managers, our roles were integral in conducting a feasibility study and proposing designs for a welcome center and bus station on campus.

The main focus of our project was to put up a versatile facility that would cater for present day transport needs as well as consider future improvements such as the proposed Bus Rapid Transit (BRT) routes serving the Route 110 corridor. The design that we created met all state and federal mandates and included accessible features, as well as sustainable practices, including photovoltaic technology for energy generation.

In this project, we faced various problems which needed unique answers and joint efforts across different disciplines. We managed to overcome complicated logistic parameters and stringent regulations by conducting site assessments among other things. This was a learning experience that gave us an opportunity to test our knowledge from school in real life situations while also teaching us how to practically manage projects.

Our project exemplifies the culmination of our efforts. Our vision for a transit hub that will enhance connectivity, make it accessible and sustainable at the same time. We are happy being part of Farmingdale State College's dream about a campus where everyone feels welcome.

Mechanistic Study of pre-mRNA Alternative Splicing in PDAC

Mr. John Apollo[1]
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Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Pancreatic ductal adenocarcinoma (PDAC) is a highly lethal malignancy with extremely poor prognosis, with an average 5-year survival rate of less than 10% (Siegel, R. L., et al., CA Cancer J Clin (2022)). Splicing factor of interest, BCAS2, is overexpressed in some cancers, and disrupts the activity of the TP53 tumor suppressor (Kuo et al., Cancer Research 2023). The mechanisms behind how BCAS2 disrupts alternative splicing in cancer remain unresolved. This project helps to understand the oncogenic role of splicing factors in PDAC, and their effect on PTBP2.

In this study, we found that upregulation of BCAS lead to increase in PTBP2 expression, which we would like to further explore the mechanisms behind in the future, as well as the effect on PTBP1.

Experimenting with the path of fastest descent under gravity

Kalegnon Dogba-Gobehi[1], **Jr Hill**[1], Dr. Manish Jadhav[1]
[1]Dutchess Community College

Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Suppose an object were traveling in two dimensions under gravity. What would the fastest path be for that object to follow? This path could be found by applying the principle of least action, which leads to the cycloid curve. This work was aimed at testing if the cycloid was indeed the path of quickest descent, i.e., a brachistochrone, among all other paths. For our trials, 3D-printed tracks were constructed using the equations for a line, a parabola, and a cycloid. Marbles were then released from the top of the curves, and photo gates were used to time the descents, confirming that the cycloid was indeed the quickest among them all. LoggerPro video analysis was then utilized to approximate the action for each curve by adding the (kinetic minus potential) energy valuesfor various points along the three paths using a 240 fps cell phone video. However, contrary to our expectations, it turned out that the action for the cycloid was always slightly larger compared to other paths. Our guess is that this could well have been a result of a marble carrying higher kinetic energy along the cycloid path, leading to a situation where all marbles for each curve were not precisely at the same displacement at the same times. Our experiment was still able to confirm the brachistochrone property of the cycloid, and helped us understand various aspects of the Principle of Least Action.

Renovation of Historical NYC Stair & Soffit Design with Modern Codes & Technology

Mr. Anthony Simpson[1]
[1]Rams Design Build

Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Renovation of Historical NYC Stair &Soffit Design With Modern Codes &Technology
In November 2023, our team from Farmingdale State College marked a significant achievement in the realm of construction and design by participating in the 33rd Annual Associated Schools of Construction Region 1 Student Competition. Our journey to this competition was driven by a blend of innovation, meticulous planning, and a commitment to preserving historical integrity while adhering to modern standards. The project that we presented was not just a design-build proposal but a testament to our dedication and skill in navigating the complexities of renovation and construction. Our proposal centered around the renovation of existing historic stairs, ensuring that the new structure would comply with the stringent 2020 New York State Building Codes. This task was challenging yet rewarding, as it required a delicate balance between modernization and the preservation of history.

One of the key highlights of our project was our commitment to preserving the existing historic staircase. We proposed adding signage for new artwork near the renovations, thereby blending history with contemporary art, creating a space that respects the past while embracing the present. Furthermore, our design included the coordination and installation of an architectural soffit that cleverly concealed MEP (Mechanical, Electrical, and Plumbing) components, showcasing our team's ability to integrate essential services into the design seamlessly without compromising on aesthetics.

The creation of a comprehensive construction schedule marked with milestones was another aspect of our project that stood out. This schedule was meticulously crafted to guide the construction team through all phases of the renovation, ensuring that the project would proceed smoothly and efficiently. The schedule was designed to be dynamic, accommodating changes and adjustments as needed, demonstrating our team's flexibility and adaptability. Winning our second award at this prestigious competition was a moment of immense pride for our team and Farmingdale State College. It validated our hard work, innovative approach, and commitment to excellence. Our project was not just a renovation of physical structures but a reimagining of what is possible when the past and future converge in design and construction. This achievement has inspired us to continue pushing the boundaries of what can be achieved in the field of construction and design, armed with the knowledge that with the right mix of creativity, dedication, and technical skill, we can turn even the most challenging projects into showcases of excellence.

In-situ core-level spectroscopy probing of calcium solvation at the electrolyte/electrode interface

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Dr. Feipeng Yang, National Synchrotron Light Source II, Brookhaven National Laboratory

Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Understanding electrolyte solvation at the interface between the electrolyte and electrode is vital for enhancing charge transfer efficiency, directly influencing battery performance. Traditional investigative techniques have faced challenges in providing in-depth analysis of this interphase, especially under real-time operational conditions. This limitation has hindered a comprehensive understanding of the interphase dynamics. Addressing this gap, our study employs synchrotron-based soft X-ray absorption spectroscopy to examine the solvation processes of a calcium-based organic electrolyte under operando conditions. The research delves explicitly into how additional anions or cations impact the solvation structure. These insights are fundamental for developing advanced electrolytes for future energy storage solutions. Furthermore, the methodologies developed through this research offer significant benefits beyond the scope of electrolyte design. They are also applicable in exploring catalysis processes at various interphases and understanding different electrochemical microenvironments. This comprehensive approach advances the electrochemistry field and sets a precedent for future research in related areas.

Exploration of Estée Lauder Companies

Christian Intriago[1], **Kayli Villalta**[1]
[1]Farmingdale State College

Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

This poster presentation delves into the intuitive experience of an internship at Estée Lauder Companies, where we served in the position of Special Analytical Services under Research and Development, contributing extensively to laboratory operations. Kayli and I are the two interns they hired for this position. It focuses on the immersion into the multifaceted world of beauty, encompassing marketing strategies, product development, and brand management. By blending prior lab knowledge with practical application, this presentation showcases the intricate interplay between academia and industry within the cosmetics sector, as witnessed firsthand during the internship at Estée Lauder Companies.
The internship within the Special Analytical Services department provided a hands-on opportunity to learn about the scientific foundations of the beauty industry. Working within the laboratory, tasks included conducting sample analyses, participating in formulation testing, and ensuring compliance with regulatory standards and standard operating procedures. Collaborating closely with experienced professionals, we gained practical skills in chromatography, spectroscopy, and microscopy techniques, enhancing our understanding of cosmetic chemistry and product safety protocols. Involvement in their projects allowed for the learning of their test methods, thorough data analysis, and technical documentation in our lab notebooks. Overall, our journey provided transferable skills we can take with us in any other lab environment we come across.

Selflessness as the Source of Happiness: The SSHM Model in Positive Psychology

Isha Singh[1]
[1]SUNY Westchester Community College

Morning Poster Session B-1, Sagtikos Lobby 1st floor, April 26, 2024, 10:30 AM - 11:30 AM

This presentation will explore the issue of happiness from the perspective of positive psychology. Informed by the Self-Centeredness/Selflessness Happiness Model (SSHM) proposed by Michael Dambrun and Matthieu Ricard, it will provide evidence that self-centeredness has a negative effect on emotional stability while notable happiness can be achieved through selflessness. It will review examples of charitable acts with emphasis on the key role of motivation. For example, volunteering or financial donations that result from guilt, obligation or concern for once's public image may produce a decrease in happiness. The same acts, if performed with the wellbeing of the recipient in mind, increase one's sense of happiness. However, as demonstrated by Nicolas Pellerin, the durability of such happiness does not extend indefinitely – it is related to the durability of benevolent behavior. Stable happiness requires embracing selflessness as a lifestyle. Explaining and calling attention to this principle is the main objective of the presentation. This is also why I felt drawn to this topic, because in a world where there is much turmoil it is very hard to hold onto happiness. By spreading information on how one could potentially enhance their happiness with selflessness, at least for a few seconds, this could help shine a spotlight on ways we can improve happiness in a world filled with terror.

STK11 gene and KRAS mutation in Non-Small Cell Lung Cancer IL 33 Response

Mr. Matthew Cruise[1]
[1]Stony Brook University

Morning Poster Session B-2, Fine Arts Lobby, April 26, 2024, 10:30 AM - 11:30 AM

Lung cancer is the leading cause of death in US Veterans. Pre-clinical studies using a mouse model in our lab showed a novel association between loss of the STK11 gene and increased IL-33 expression in KRAS mutant non-small cell lung cancer (NSCLC) lacking STK11. While the effects of targeting IL-33 in human NSCLC is unknown, based on our lab results, we hypothesize that immune checkpoint inhibitor(ICI) response rates in KRAS and STK11 altered NSCLC will be inversely related to the fraction of tumor cells secreting IL-33.

To test this hypothesis, we have identified 3,811 specimens from US Veterans with NSCLC harboring alterations in STK11 alone (n=893), KRAS alone (n=2,149), or both (n=769) via comprehensive genomic profiling using the VA National Precision Oncology Program (NPOP) database. Matching clinical information is available from the VA's electronic medical record including demographics, tobacco exposure, therapeutic interventions, and survival times. A single de-identified unstained slide from each specimen will be sent for IL-33 IHC staining and labeled as "1" or "2" or "3" based on previously randomized list of assignments for the specified genotype (KRAS alone or STK11 alone or KRAS with STK11). A pathologist will review the slides, blinded to the genotype of the cancer, and score IL-33 expression of the tumor on a scale of 0 to 3. Clinical data including response to ICI therapy and survival time will be abstracted from the VA clinical database and linked to each specimen analyzed. Data analysis will be performed to determine correlation between response to ICI therapy and survival time. Parametric and non-parametric statistical analyses will be performed to determine the significance of the correlations.

While it is too early to report results, this is an ongoing project of great significance that we will report on as soon as data is available.

Poster Session Abstracts

Afternoon Sessions

PySpady: Sparse Multi-Dictionary Coding Python Library

Mr. Michael Paglia[1]
[1]University at Albany - SUNY

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

PySpady enables users from all disciplines to leverage state-of-the-art and classical sparse encoding algorithms and methodologies to jointly model spatial-temporal data by graph and temporal dictionaries. The current implementation efficiently exploits both structural graph regularities and temporal patterns encoded within 2D temporal graph signals (McNeil et. al, 2021) and more generally any multi-way tensors (McNeil and Bogdanov, 2023) with priors on all or a subset of modes. Users can input data in the form of either a JSON configuration file or a pandas DataFrame. This Python library is capable of performing missing value imputation, future value prediction, and downstream tasks such as outlier and community detection, along with generating visualizations and explanatory figures to derive meaningful insights. Perhaps most important is the ability to automatically configure an optimal combination of hyperparameters and dictionaries to perform the best reconstruction of a given matrix or tensor when considering missing entries. This exemplifies PySpady's accessibility and usability since prior knowledge of machine learning or statistical concepts is not required. Ample documentation and various demonstration datasets are provided to the user upon execution, including both synthetic and real-world examples. For instance, one of the datasets included in the library is based on New York City's taxi pickup and dropoff frequencies across nearly three hundred locations throughout 2017. PySpady's implementation provides an easily accessible and user-friendly solution to spatial-temporal data reconstruction along with interactive data visualization methods.

Assessing the Advantages of Robotic-Assisted vs Traditional Surgery

Elizabeth Cintron[1]
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Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

This study explores the ways in which sociological factors and technological developments are affecting today's healthcare, offering a thorough understanding of surgical procedures and patient experiences. The research question is: What are the effects of robotic-assisted surgery on patients in terms of complications, recovery periods, surgical accuracy, and recovery effectiveness compared to traditional surgery during this ever-increasing integration of technology in healthcare settings? The hypothesis is that these patient outcomes will be greatly improved by robotic-assisted surgery (RAS) as compared to traditional surgeries. This research combines qualitative interviews, gathering data, and analysis using a mixed-methods approach. Two groups are being observed; one is having traditional surgery, while the other is having robotic surgery for numerous cancerous tumors. The independent variables include the surgery type (robotic vs. conventional). The dependent variables are complication rates like infections, bleeding, or organ damage. The second variable is recovery time and how long it takes for them to have a full recovery and resume their normal routines. The third is surgical accuracy, evaluating the accuracy and precision of the surgical operation. The last variable is assessing the effectiveness and performance of the surgery while achieving objectives like tumor removal and symptom relief.
This study has relevance as it has the ability to educate and progress the healthcare industry by illuminating the efficacy and consequences of integrating digital health technology, such as robotic-assisted surgery. Results yield that utilizing digital health technologies will enhance the patient's primary care, that unfavorable public perceptions are a significant influence on the avoidance of robotically assisted surgeries, and that the hypothesis is valid.

Prevalence of periodontal disease in patients with uncontrolled diabetes vs controlled diabetes

Derrick Pouncy[1]
[1]Farmingdale State College

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

Diabetes is defined as a group of diseases that result in too much sugar in the blood Diabetes type 1 and type 2 come from different causes: In diabetes type 1, the pancreas does not make insulin, because the body's immune system attacks the islet cells in the pancreas that make insulin. In diabetes type 2, the pancreas makes less insulin than used to, and your body becomes resistant to insulin. Managing diabetes is a very important part of the treatment plan which can be done through diet, oral medications, and insulin. Periodontitis is common but fairly preventable. The cause is usually poor oral hygiene. Periodontitis, also referred to as gum disease, is a serious gum infection that damages the soft tissue around teeth. Without treatment, periodontitis can destroy the bone that supports your teeth. This can cause teeth to loosen or lead to tooth loss. There is a link between diabetes and periodontal disease. Through research of database articles, I was able to conclude that Type 1 diabetes mellitus increases the prevalence of periodontitis 4-fold compared with normoglycemic controls. This project was done at the University of Buffalo over the summer and took place over a 6 week span.

Stretch Threshold: Examining See-Through Issues with Spandex

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Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

For the last two decades, the explosive increase of activewear consumers has created a varying range of quality products using elastic textiles. The cheap products have no longevity and expose a serious problem within this market. Some products are see-through when they are being used as advertised. Even more recently, it has been shown that the higher-priced brands are also having this same issue. The term I will be using for the amount of force applied until it is see-through is the "stretch threshold". Where in the production process is a problem arising? What changes can be made? The objectives of this study are: (1) Find what spandex percentage and weight of a textile provide comfort while remaining opaque when in use. (2) Compare the percentage and weight with other fabrics used in the industry. (3) Test and find the "stretch threshold" of each textile. Firstly, a commonly used fabric in the industry will be tested for its spandex percentage, weight, and threshold before becoming transparent. Secondly, the experimental group: textiles with varying elasticity and weight will undergo the same testing. The expected finding is that a higher fabric weight with increased elasticity will have a better "stretch threshold" without compromising the performance. The project can provide invaluable insight for the activewear industry to develop comfortable and non-see-through products.

Development of Water Repellent Natural Fabrics

Burak Yilmaz[1], **Mr. Mehmet Yelbay**[1], **Mr. Mehmet Koyuncu**[1], Dr. Huipu Gao[1], Prof. Sean Cornier[1], Dr. Md Imranul Islam[1]
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Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

Water repellency in textiles is a critical attribute influencing their functionality and performance in various applications. As consumers' awareness of sustainability grows, natural fabrics like cotton and hemp are preferred. However, their inherent hydrophilic nature limits their utility where water repellency is essential. This study aims to develop water-repellent cotton and hemp fabrics by applying water repellent finishing and comparing their performance with polyester fabric. Specifically, water repellent finishing will be applied to cotton, cotton/polyester blend, hemp, and polyester fabrics, followed by a rigorous evaluation of their hydrophobic properties. This includes measuring parameters such as contact angle, and water penetration resistance. Testing will be conducted on both untreated fabrics and those treated with water-repellent finishes to assess the impact of treatment on repellency. Polyester fabrics are anticipated to exhibit the highest level of water repellency due to their inherently hydrophobic nature. Cotton fabrics may demonstrate moderate repellency, especially when blended with polyester. Depending on their processing and finishing treatments, hemp fabrics might exhibit varying degrees of repellency. The findings of this study will facilitate the understanding of water repellency in different textile materials, informing product development and selection processes in various industries such as outdoor apparel, upholstery, and technical textiles. Additionally, by developing water repellent natural fabrics, the study contributes to a more sustainable fashion industry.

A Study Comparing Flame Resistant Properties of Polyester and Cotton Fabrics Used in Children's Sleepwear

Brooke Funnell[1], **Alexis Hardcastle**[1], Dr. Huipu Gao[1], Prof. Sean Corimer[1], Dr. Md Imranul Islam[1]
[1]Fashion Institute of Technology

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

Children's sleepwear must meet a certain flame resistance standard according to the CPSC (Consumer Product Safety Commission). Certain fabrics and structures are generally used in children's sleepwear because of their flammability properties. The objective of this study is to determine which fabric and structure are the most suitable for children's sleepwear. It will also be observed which fabric best meets industry standards and regulations regarding flame resistance. We will also repeat each test on the fabric after a few washings to observe if a change in flame resistance has occurred. The procedure for the tests will follow the standard testing method for flammability. The specimens will be suspended vertically in a metal holder. A gas flame will be applied to the bottom edge of the specimen for three seconds. The char length of each sample will be measured to determine whether it meets flammability resistance standards. We expect to find that the polyester knitted fabric will display the best flame resistance properties. We also expect that after a few launders, the flame resistance of all fabrics will not change significantly. These tests take place to ensure the safety of children. With growing instances of recalls in children's sleepwear across the US, it is important to determine the proper fabrics and structures suitable for children's sleepwear to reduce this number. With further research and testing, parents can feel secure in the products they purchase.

Durability on Natural Dye on Swimwear

Karla Garcia[1], **Nyema Wiggins**[1], **Aviana Williamson**[1], Dr. Huipu Gao[1], Sean Comier[1], Dr. Md Imranul Islam[1], Ajoy Sarkar[1]
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Afternoon Poster Session–A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM – 2:45 PM

Synthetic dyes are commonly used in bathing suits to keep the color durable in the water, but their adverse environmental impact poses a significant challenge to the textile industry. To address this issue, our group aims to naturally dye white swimwear products with flowers. Firstly, we will extract dyes from flowers and make them into a dye bath. Prior to dyeing, the fabric will undergo mordanting with aluminum sulfate to enhance the bonding between dye molecules and fibers. Additionally, the fabric will be dyed with synthetic acid dye for the purpose of benchmarking. We will compare both samples regarding their colorfastness against laundering, seawater, chlorine water, and sunlight. While we anticipate the naturally dyed sample to demonstrate acceptable colorfastness against these factors, it is expected to be slightly inferior to the synthetic dyed fabric. Our objective following the conclusion of this experiment is to raise awareness regarding the utilization of natural dyes, which will encourage their widespread use. It is key to recognize that the effectiveness of applying natural dyes may depend on the fiber content. However, our project seeks to clarify if using natural dyes is feasible in comparison to synthetic ones while promoting their advantages, such as increased sustainability, affordability, ease of use, and safety concerns.

A Study of All Day Fresh Smell Cotton T-Shirts

Haným. Selin Ersayin[1], **Ms. Ece Hilal Bayram**[1], Dr. Huipu Gao[1], Prof. Sean Cornier[1], Dr. Md Imranul Islam[1], PH. D. Preeti Arya[1]
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Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

There is a growing demand for clothes with extra features like odor management. Cotton t-shirts, while popular for their comfort and breathability, tend to cling to body odors and require fragrance washing to stay fresh. The primary purpose of this project is to investigate the possibility and efficacy of integrating fragrance into 100% cotton t-shirts to ensure they retain a nice odor even after extended use. This technique will be optimized through a series of tests that measure aroma retention over time and over several wash cycles. It is expected that treated cotton t-shirts will retain a higher degree of fragrance than untreated t-shirts, independent of the number of wash cycles or intensity of activities done by the wearer. Furthermore, consumer satisfaction ratings are projected to be significantly higher for individuals who use the treated shirts, noting greater odor management and a more enjoyable wearing experience. If the projected results are confirmed, the study will conclude that incorporating scent into 100% cotton t-shirts is not only feasible, but also effective in improving the consumer's experience by keeping a nice odor. The research has wide-ranging ramifications that could impact the development of longer-lasting, fresh apparel and so impact future textile production techniques. The study's findings may stimulate additional research into the use of natural smells and their advantages, not just for odor management but also for mood enhancement and stress reduction.

Application of Avocado Skin Extract as Natural Dye on Hemp and Silk Fabrics

Grace Alber[1], **Ms. Coralys Bosques Ortiz**, Dr. Huipu Gao, Whitney Crutchfield, Prof. Sean Cornier, Dr. Md Imranul Islam
[1]The Fashion Institute of Technology

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

The purpose of conducting a project on colorfastness in hemp versus silk dyed with avocado skin extract is to promote natural sources encompassing sustainability, consumer awareness, and innovation. The project aims to contribute to the ongoing transition towards a more sustainable and environmentally conscious fashion industry by addressing these core objectives. This study aims to (1) naturally dye hemp and silk with avocado peel waste sourced from local restaurants. (2) test the durability of color on each fabric against various factors. We will optimize the dyeing process and the extraction process from avocado skin. After that, the colorfastness of naturally dyed hemp and silk fabrics against washing, sweat, and sunlight will be evaluated. It is expected to find color change in both fabrics. We hypothesize that hemp will change color more than silk during performance tests. Chemical dyeing has significant environmental impacts, including pollution of water bodies, health risks to textile workers, and disruption of ecosystems. Natural dye is a better alternative since they are completely biodegradable, meaning it will break down on its own over time without releasing harmful pollutants into the environment or soil.

Kelp Fabric Development

Ms. Anna Le[1], **Ms. Sally Li**[1], **Ms. LILY KIM**[1], Dr. Huipu Gao[1], Prof. Sean Cornier[1], Dr. Md Imranul Islam[1]
[1]Fashion Institute of Technology

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

Alginate fibers, extracted from Kelp, have been widely used as wound dressing due to their ion exchange and gel-forming abilities. However, alginate fibers on their own have low tensile strength and low stability in water, limiting their applications in the textile industry. Modifications are needed to improve the performance of alginate fibers. The objective of this study is to (1) create fibers using sodium alginate: one without nanofiller (control) and another with nanofiller incorporated; (2) examine how the nanofiller increases the performance of sodium alginate fiber; (3) compare the performances of two different biomass fibers for their potential applications in the textile industry. To get started, sodium alginate powder will be mixed with distilled water to create a solution. This solution will be spun in a calcium chloride water bath to create the control fiber. As for the nanofiller fiber, the nanofiller will be added to the sodium alginate solution before spinning. After drying, tests such as strength and stability in water will be performed on both fibers. It is expected the nanofiller added to sodium alginate will help increase tensile strength and water stability. Nanofiller has high strength and good stiffness, which makes it an ideal reinforcer for alginate fibers. There is increased awareness and global market demand for sustainability. Kelp polysaccharide is an excellent resource due to its abundance and biodegradability. This study will provide empirical insights into the properties and improvements of adding nanofillers into alginate fibers, thereby contributing to the advancement of sustainable textile materials.

Comparative Analysis of Wool and Synthetic Activewear: Assessing Durability and Sustainability

Prof. Sean Cornier[1], Dr. Md Imranul Islam[1], **Shai Dubitzky-Mazor**[1], **Ms. Melanie Cottone**[1], **Aubrey Bethon**[1]
[1]Fashion Institute of Technology

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

In recent years, synthetic materials have dominated the activewear industry due to their affordability and performance attributes. However, with an increasing emphasis on sustainability from consumers, wool has experienced a resurgence as a favored fiber in activewear. Wool offers natural moisture-wicking abilities, durability, and environmental benefits, making it an attractive option for eco-conscious consumers. Assessing the sustainability and performance of both wool and synthetic fibers is critical in informing activewear production decisions in the context of evolving consumer preferences. This research aims to compare the durability and performance capabilities of wool and synthetic fibers in activewear, focusing on moisture management, abrasion resistance, and washing durability. Wool and synthetic leggings will be subjected to standardized tests for moisture management, abrasion resistance, and washing durability. Moisture Management Testing (MMT) will be conducted to measure the fabrics' ability to transport moisture away from the body. Abrasion resistance will be evaluated using the Martindale method, simulating wear over time. Washing durability is tested over three wash cycles to assess durability in consumer care. Based on our hypotheses, we anticipate that wool leggings will outperform synthetics in moisture management testing, demonstrating superior moisture-wicking properties. Conversely, synthetic leggings are expected to exhibit better shape retention after washing due to their inherent characteristics. Synthetic materials are predicted to demonstrate greater abrasion resistance compared to wool. This research aims to offer insights into the sustainability of wool and synthetic fibers in activewear manufacturing. By assessing their performance capabilities, manufacturers and consumers can make informed choices, potentially leading to the development of more sustainable activewear options.

Synthesis of Chitosan Based Super Absorbent Polymer

Ms. Samantha Galanti[1], Dr. Huipu Gao[1], Ajoy Sarkar[1], Dr. Md Imranul Islam[1], Prof. Sean Cornier[1]
[1]Fashion Institute of Technology

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

Baby diapers consist of multiple layers, including a top sheet, acquisition/distribution layer (ADL), absorbent core, and backsheet. The absorbent core, the thickest part of the diaper, consists of wood pulp and superabsorbent polymer (SAP). According to EDANA, a leading global nonwoven association, the composition of a regular diaper includes about 35% wood pulp, 33% SAP, 17% Polypropylene (PP) nonwoven, 6% PE Film, 4% adhesive, and other minor components. Except wood pulp, the remaining materials in diapers are non-biodegradable. It is worth noting that a baby consumes approximately 5,000 diapers in average during their first three years. Due to contamination and hygiene concerns, recycling these diapers is impractical, making them the third-largest single consumer item in landfills. The non-biodegradability, non-recyclability, and high consumption of diapers create an immeasurable impact on the environment, and there is no sign of ending. Therefore, it is imperative that diapers be made with more environmentally friendly materials in efforts to tackle the climate crisis and be in accordance with the United Nations Sustainable Development Goals. Chitosan, a promising candidate for this purpose, is the second most abundant natural biopolymer found in the exoskeleton of crustaceans, insects, fungi, and nematodes. Through chemical crosslinking, Chitosan can exhibit similar or higher absorbency compared to conventional SAP. Utilizing an environmentally benign method to hydrothermally synthesize chitosan, citric acid, and urea, this preliminary research serves to compare the water absorption capacities of Chitosan-based super absorbents as a replacement for conventional synthetic SAP.

Moisture Impact on Wool Fiber Insulation

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[1]Fashion Institute of Technology

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

There's an old theory that goes around in the protein fiber community that says wool retains its insulation properties up to 80% when it's completely wet. In this experiment, we are going to test that theory along with the insulation capabilities of other protein fibers like mohair, vicuna, camel, and alpaca when wet. The objectives of this study are to (1) determine if it's true that wool retains 80% of its insulation capabilities when wet, and (2) compare the dry and wet insulation properties of other protein fibers to the wool results to see if they differ at all. To conduct this experiment, we will apply moisture into the fabrics and test the insulation of all samples at different % moisture pick-up (100%, 50% 30% 0%). We expect to observe that wool will lose some insulation with the increase of moisture pickup, but it may still be able to retain most of its insulation properties when wet. We also expect that when we compare the wool insulation values to the other protein fibers, they will be different. Overall, we hope to find out how moisture impact the insulation of various protein fibers and then apply what we have learned to some winter wear, in particular, wool ski socks. This research is crucial given the challenges of moisture accumulation in ski boots and its impact on foot comfort.

Dye Alternatives: Exploring Cephalopod Ink as a Natural Dye

Ms. Ashley Choi[1], **Ethan Tran**[1], **Britney Zamora**[1], Dr. Huipu Gao[1], Dr. Md Imranul Islam[1], Prof. Sean Cornier[1], Ajoy Sarkar[1]
[1]FIT

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

Cephalopod ink is a byproduct of the fishing industry. Cephalopod is defined as “Any of a class (Cephalopoda) of marine mollusks including the squids, cuttlefishes, and Octopuses, etc.” While the ink produced by cuttlefish is edible, squid ink is often tossed away. We plan on using both squid and cuttlefish ink as an alternative to other available natural dyes. Using these ink alternatives would provide an end use to what is normally wasted in the food industry. The objectives of this study are: 1) to determine the color range achievable with cephalopod ink on fabric swatches, (2) to evaluate the performance of these dyes for potential commercialization, and (3) to compare their performance against currently available natural dyes, such as walnut. Cotton swatches will be dyed in a solution composed of cephalopod ink and another solution composed of a different natural dye. Then the colorfastness performance of these swatches against washing, sweat, and light will be compared. We expect the color from cephalopod ink dyed fabric will be anywhere from a dark purple to black. We hope to produce a pigment that will perform well at a commercial level, while also competing with the wide variety of black dyes already available on the market. Given that the dye jobs are successful, we hope to help both the fishing and fashion industry become a little more sustainable. With the fashion industry’s recent focus on sustainability, brands may be eager to pick up new sustainable dye options. The ultimate goal of this study is to determine if the dye can be used on a commercial scale.

Waterproof Fabric Made from Styrofoam Waste

Austin Che[1], **Tariq Karam**[1], **Jonathan Bowman**[1], Prof. Sean Cornier[1], Dr. Huipu Gao[1], Prof. Sean Cornier[1], Dr. Md Imranul Islam[1]
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Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM – 2:45 PM

Waterproof and breathable fabrics, such as Gore-Tex, are extensively employed in apparel to provide warmth and dryness to consumers. These products feature a microporous membrane that prevents water droplet penetration while allowing the passage of moisture vapor, ensuring breathability and waterproofness. Nonetheless, these products are associated with sustainability concerns. This project aims to address this issue by repurposing waste Styrofoam into nanofiber nonwoven film through electrospinning, thereby creating a more environmentally friendly alternative. Firstly, waste Styrofoam materials will be dissolved to create solutions with different concentrations. The solutions will then be spun into nanofiber nonwoven using an electrospinning machine. Parameters such as voltage, feed rate, distance between spinneret and collector, will be optimized. Nanofiber nonwoven is fragile and cannot be used independently. Thus, we plan to create a three-layered prototype fabric using upcycled Styrofoam electrospun nonwoven membrane as a middle layer, bonded to two lightweight waterproof cotton fabrics. Performance tests will be conducted to assess its waterproofing capabilities and breathability. It is expected that our fabric textile can demonstrate satisfactory breathability and waterproofness. The final product of this study can provide a more sustainable alternative for those high-performance fabrics, allowing for functionality in multiple end products including activewear, outdoor equipment and accessories.

Care and Performance: A Study on Stain Removal Effectiveness

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Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM – 2:45 PM

Background: Color cosmetics such as concealer and foundation are daily beauty necessities for consumers worldwide. These products promise to cover, smooth, and enhance skin tone, texture, and finish on one's face and neck. However, when foundation is transferred to clothes it may produce unpleasant beige or brown stains on the surface of the textile that are difficult to remove. Objective: Thus, this study aims to investigate the effectiveness of the market's top-selling commercial detergents against the stains from silicone-based face makeup on different fabrics: cotton, polyester, and acrylic. Method: The following will be used: two commercial detergents, classic Tide, and a plant-derived free and clear alternative; one liquid foundation; and three white woven fabrics. A quarter-sized amount of makeup will be applied to the fabrics with the stain left to set for 5 minutes. One swatch of each will be laundered with either detergent. After laundering, the fabrics will be air-dried. The depth of staining will then be evaluated using AATCC's Grey Scale and Spectrophotometer. Expected Findings: It is expected that the detergent containing standard surfactants, enzymes, and polymers may perform better. In addition, the fabric color and material type will also affect the degree of staining. Conclusions and Implications: This study will help determine the viability of cleaning power and fabric care in removing makeup stains from natural and synthetic fabrics. Furthermore, there are implications for extending the lifecycle of textiles in the marketplace due to premature discarding from everyday makeup stains.

Reverse Engineering Desserto® Cactus Leather and Verifying it as a Sustainable Leather Alternative.

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Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM – 2:45 PM

The fashion industry faces a dilemma concerning the use of natural leather and its environmental impact. While animal leather offers desirable attributes such as durability, breathability and flexibility, for shoemaking, handbags and outerwear, its production involves processes like tanning, which use chromium, a toxic substance with harmful effects on the environment and other irresponsible processing that contributes to heavier carbon footprints resulting in environmental degradation. In response to increasing concerns about sustainability, there has been a shift towards utilizing plants in manufacturing leather like materials. Cactus leather, prepared by a brand named Disserto, has emerged as one such sustainable alternative, offering a promising solution to mitigate the environmental footprint created by traditional animal-based leather. This cactus-based leather presents a considerably lower environmental footprint compared to both traditional and synthetic leather, as indicated by the preliminary Life Cycle Assessment (LCA) available on the Desserto® website (Desserto, 2022). However, there remains some ambiguity regarding its complete biodegradability, as it is only stated to be PVC-free and still contains approximately 28% of either bio polyurethane or synthetic polyurethane (MoEa, 2022). Although Desserto claims that their cactus leather is sustainable, there has not been enough research to support their claims. This study therefore, focuses on analyzing the Disserto's cactus leather for biodegradability, and chemical fingerprinting using an FTIR. Other tests include observing and analyzing Scanning Electron Micrograph, abrasion resistance, flammability, Differential Scanning Calorimetry and CLO value.

Investigating Transferable Skills: An Urban Study

Keith Baessler[1], **Ms. Naomy Nolasco**[1], **Katherine Martinez Diaz**[1]
[1]Ammerman, Suffolk County Community College

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM – 2:45 PM

Transferable skills are versatile abilities gained from diverse experiences, useful in different settings to improve performance and achieve success. This study explores the significant role of transferable skills in STEM education and their profound impact on students' academic and professional paths. Through extensive surveys conducted at Suffolk County Community College (SCCC) and Nassau Community College (NCC), our research aimed to evaluate students' confidence levels, pinpoint areas for improvement, and make meaningful comparisons to extract valuable insights. With our hypothesis anticipating similar outcomes between SCCC and NCC due to similar curriculum alignment, teaching standards, demographics, and local industry influence, initial findings indeed supported our expectations. This project has served as a pilot study, paving the way for future investigations and broader distribution. The outcomes of our research may eventually serve as a roadmap for refining curriculum and enhancing instruction, enabling educators to better equip their students for success in today's dynamic workforce. Through collaborative efforts and proactive initiatives to increase student and faculty awareness, our research aims to cultivate a new generation of proficient professionals ready to tackle the challenges of the modern world with confidence and competence.

Exploring Inner Speech, Self-Identity, and Well-being: The Impact of Selfie Engagement

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Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM – 2:45 PM

In Study 1 of this research initiative, we explored the relationship between personal identity and well-being through inner speech. Inner speech experiences, including time orientations and perspectives, were correlated with well-being, authenticity, and meaning in life. Specific inner-speech variables consistently predicted outcomes, even after considering personality traits. In current research, we aimed to establish causality, by manipulating participants' self-awareness. We administered an online self-report survey to 10 participants, randomly assigned to selfie or non-selfie conditions. As part of the survey, Participants were asked to upload a picture of either themselves (selfie) or a nearby object (non-selfie). Participants also reported their social media use, current inner speech, levels of self-consciousness and self-absorption, and their current thoughts and feelings about authentic living, meaning in life, and well-being. Participants in the selfie conditions reported higher levels of self-critical inner speech and public self-consciousness than those in the non-selfie condition. Statistically non-significant but marginal trends suggest increased inner speech about how others perceive them and higher private self-consciousness in the selfie condition. However, no significant differences were observed in authenticity, subjective well-being, or meaning in life, though marginal indications of greater self-alienation, lower positive affect, and lower life satisfaction were noted in the selfie condition. Overall, taking selfies appears to correlate with heightened self-criticism and public self-awareness, with potential implications for psychological well-being.

Identifying protective factors in LGBTQ+ suicide risk: The impact of community and authenticity

Colette Vaughan[1]
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Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM – 2:45 PM

The goal of the present study was to establish if positive components of Lesbian, Gay, Bisexual, Transgender Queer/Questioning (and related; LGBTQ+) identity can moderate suicide risk. More specifically, we aimed to determine if a sense of belonging within the LGBTQ+ community and embracing one's LGBTQ+ identity (authenticity, outness, and self-acceptance) moderated the link between adverse childhood experiences (ACEs) and history of bullying to lifetime history of suicidal ideation (SI) and suicidal attempts (SA). To address this, a sample of 260 LGBTQ+ participants completed assessments of ACEs, history of bullying, positive LGBTQ+ identity (authenticity, community, self-awareness, intimacy, social justice), outness, and self-acceptance of sexuality. Bivariate analyses indicated that ACEs and bullying were positively associated with SA, and a sense of community was negatively correlated with SA. No variable significantly correlated with SI. All sociodemographic and psychosocial variables were then entered into a binomial logistic regression. The model with SI as the dependent variable was not significant. However, for SA, ACEs persisted as predictors, though bullying did not. Sense of community negatively predicted SA (aOR = 0.62), whereas authenticity, positively predicted SA (aOR = 1.75; both ps < .001). Adding the interaction term between community and authenticity significantly improved model fit. Examination of the slopes of the interaction indicated that the odds of reporting an SA increased as authenticity increased, and community decreased. These results suggest that, without community, authenticity may increase suicide risk, perhaps by increasing loneliness and/or thwarted belongingness. LGBTQ+ community engagement may be an avenue for suicide prevention efforts.

Inclusive Education through Automated Grading: Leveraging Large Language Models

Laura Fonseca-Llorca
[1]Student

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

This project introduces an AI-driven test-taking application designed to alleviate barriers encountered by students with exam anxiety, writing difficulties, typing constraints, or speech impediments. Leveraging the Google Gemini Pro multimodal model, the application generates questions and an answer key from textual content, thus providing a novel avenue for inclusive assessment practices.

The methodology involves the presentation of questions to users, who respond using speech-to-text functionality seamlessly integrated into the application's user interface. Through this process, spoken responses are efficiently transcribed into text format, facilitating a smooth comparison with the answer key through sophisticated AI algorithms. This innovative approach not only simplifies the examination process but also ensures equitable access to assessments for students with diverse needs.

Furthermore, the application autonomously grades the exam, eliminating the need for manual assessment and offering educators more time to focus on personalized instruction. By embracing AI technology, this initiative not only addresses immediate challenges in educational evaluation processes but also paves the way for future advancements in adaptive learning methodologies.

This initiative serves as a testament to the transformative potential of AI-driven solutions in fostering inclusive learning environments. By empowering students with diverse learning profiles, it underscores the commitment to equity and accessibility in education. Through rigorous research and meticulous implementation, this project aims to reshape the landscape of educational assessment, making it more accessible, efficient, and equitable for all learners.

Perceptions of Creepiness: Characteristics of People Who 'Creep' Us Out

Terri Payne[1], **Mr. Joseph Devita**[1]
[1]Farmingdale State College

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

Extant literature on creepiness focuses on approximations of human behavior made by non-human entities typically in the context of an artificial intelligence of human-like robot. There is a dearth of research surrounding creepiness as a psychological phenomenon. Prior research has found that creepiness appears to be a distinct feeling-state centered around the ambiguity of threat, both physical and sexual. Additionally, research has revealed that men are considered to be overwhelmingly creepy compared to women. The aim of the current study was to replicate past findings as well as introduce elements from research on morality, emotion, and facial processing. Over 100 Farmingdale State College students from a diverse ethnographic background reported behaviors, occupations, and hobbies that they deemed to be 'creepy' based on prior experiences and hypothetical scenarios and provided ratings of perceived attractiveness, trustworthiness, dominance, and creepiness of a standardized set of male faces. Results showed that individuals thought to be creepy were: untrustworthy, unattractive, disgusting, morally bad, and lacking moral standards. Among reported creepy hobbies, behaviors surrounding collecting or watching heavily present in the data. Concerning occupations, clowns were among the creepiest professions, followed by occupations associated with death and sex (morticians and sex shop owners)—replicating past findings. Finally, imagined scenarios of encountering a creepy person were thematically tied to behaviors that were considered socially abnormal and appearances that indicated poor hygiene or lack of care for self-image.

Mental Health Benefits of Physical Activity

Mr. Joseph Batista[1]
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Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

It is common knowledge that physical activity is good for one's physical health. But is there a correlation between physical activity and happiness? This presentation will review evidence that proves the positive impact of physical exercise, including such basic activities as the number of steps taken each day, on one's mental and emotional well-being. It will address the role of exercising in the stimulation of mood-related hormones (endorphins, dopamine, oxytocin, adrenaline) and neurotransmitters (endocannabinoids, serotonin). The presentation will review specific studies showing that physical exercise decreases the probability of becoming depressed and can even relieve symptoms of mental illness. The correlation between exercise, serotonin production and sleep patterns will also be discussed. In addition, attention will be drawn to the social benefits since physical activity can help people forge relationships with those they exercise with, thereby assuaging loneliness. Lastly, the presentation will address the risks associated with not implementing enough exercise in one's life. With the rates of mental health issues on the rise, the importance of physical exercise as a significant mitigating factor must be stressed. What motivated me to do this project was my personal experience of physical activity improving my mental health and relationships. I hope the audience will consider implementing exercise into their daily lives if they are not already doing so, after learning about the positive effects physical activity can have on one's mental health.

The Importance of Writing and Choice in the Classroom

Jessica Schweers[1]
[1]SUNY Old Westbury

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

Incorporating writing in the classroom is a very important piece of education for students and their academic development. As I observe my fifth-grade students working on their writing notebooks, I have found many benefits and a great excitement for writing in the students. When we incorporate the aspect of choice in any kind of work in our classrooms, the students are more likely to thrive in their learning. These writers' notebooks allow students a choice to write about something they love, have always thought about, or seems to hold a special place in their brain. When the classroom teacher or I ask the students to take out their writers' notebooks, the students cheer. They take pride in their personalized notebooks as well as their personalized writing within. In the class, we have a few students classified with disabilities. I have been keeping a close eye on these students who struggle with writing most of the time. Two of them are thriving in their writing in their notebooks. Every time we write during class time they are completely hooked, and, in the flow, it is near impossible to get their attention to stop writing. Both the classroom teacher and I are extremely impressed by these few short weeks of incorporating the writers' notebooks in the classrooms and the benefits it has produced for our students.

The mathematical relationship between machine learning and math

Jonathan Mata[1], **Mr Joel Cruz**[1], **Mr Jonathan Wu**[1]
[1]Suffolk County Community College

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

Artificial Intelligence (AI) has experienced a significant surge in popularity in recent years, encompassing various applications beyond generative models like ChatGPT. Many AI systems rely on machine learning algorithms grounded in mathematical principles. In our research, we delve into several examples of supervised learning algorithms, including linear regression, logistic regression, Naive Bayes, and K-Nearest Neighbor (KNN). Our objective is to evaluate these algorithms using a provided dataset and illustrate the underlying mathematical concepts driving each one. Through meticulous experimentation and analysis, we aim to compare and contrast the performance of each algorithm to determine the most suitable approach for our specific dataset. By delving into the mathematics behind each algorithm, we seek to gain a comprehensive understanding of their functioning and applicability in real-world scenarios. Linear regression, for instance, is a fundamental technique for modeling the relationship between a dependent variable and one or more independent variables. Logistic regression, on the other hand, is commonly used for binary classification tasks, employing a logistic function to estimate probabilities. Naive Bayes, a probabilistic classifier, assumes independence among features and is particularly effective for text classification and spam filtering. K-Nearest Neighbor (KNN) algorithm, meanwhile, makes predictions based on the majority class of its k-nearest neighbors in feature space. By rigorously testing and analyzing these algorithms, both empirically and theoretically, we aim to contribute to the broader understanding of machine learning techniques. Through our exploration, we strive to uncover insights that can inform the selection and implementation of AI models in various domains, advancing the field of AI-driven solutions and their practical applications.

A Comparison of the Nordic, Canadian and American Healthcare Systems

Christian Neves[1]
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Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

The United Nations World Happiness Index shows that Nordic countries, such as Finland, Sweden, Norway, and Denmark have consistently held the highest happiness ratings in recent years, with Finland placing first for the past five consecutive years. These countries combine a capitalist economy with generous social benefits, and the health policies they embrace have a significant impact on the levels of life satisfaction among their citizens. This presentation will provide a review of the Nordic healthcare system, with a focus on funding through general taxation, which covers 75 – 85% of the costs of health services, and high quality, which is evidenced by patient satisfaction of approximately 80%. A comparison will be drawn between the approach to health care in Scandinavian countries and Canada, where policies implemented by the government under the Canada Health Act are also funded through general tax revenue which allows for public health coverage of 100% of the population in each territory and province. The presentation will attempt to explain why such models are not likely to be adopted in the United States, and it will analyze efforts to improve the American healthcare system through the Affordable Health Care Act, spearheaded by the Obama administration, and subsequent Medicare for All proposals, championed by Bernie Sanders.

Arhtrobacter globiformis NRL B-2880 bacteriophages Isolated and Characterized from local soils in Long Island

Eshal Mohiuddin[1], **Ms. Zara Kabir**, **Judy Hasan-hafez**, **Gabriella Azab**
[1]SUNY Old Westbury

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

SUNY Old Westbury joined the 10th Cohort of HHMI SEA-PHAGES in 2017. The phage discovery component was integrated into the general biology I laboratory (BS2401). Herein we report the results of the Phage Discovery component. The course enrolled 15 students. Nine bacteriophages were isolated using an enriched isolation. All of them were isolated from soils in Nassau or Suffolk counties. The phages were isolated and purified at SUNY OW. All of them have a Syphoviridae morphotype with a head and a non-contractile flexible tail. One of them, Turab, was sequenced at the University of Pittsburgh. It is a temperate phage 43,119 base pairs long, and 66.9% GC content and it belongs to the AZ1 cluster. It was isolated by Gabriella Azab and Verina Anis from soil from a garden on campus. It forms plaques of 3.6 ± 0.55 mm in diameter and a titer of 2.52 x 1010 PFU/ml.

Forensic Identification of Old Bones: Are They Animal or Human?

Kira Bovee[1]
[1]SUNY Adirondack

Afternoon Poster Session-A1, Sagtikos Lobby 1st floor, April 26, 2024, 1:45 PM - 2:45 PM

The discovery of skeletal remains raises the forensic question – are bones encountered in ambiguous circumstances from an animal or human? DNA testing can provide an answer; however, bone is a difficult tissue to extract DNA from, particularly when it has been exposed to degrading elements in the environment. The objective of this research is to provide and determine a method that can clearly identify bones of ambiguous nature and circumstance on a molecular level by extracting a sufficient amount of DNA and using species-specific DNA markers. A Promega Extraction kit was used on two Homo sapiens (human) bones, two Sus scrofa domesticus (porcine) bones from Locust Grove Farms which acted as controls, and two additional non-human bones from various environments and unknown periods of time presumed to be of porcine origin through general morphological features and measurements. The aforementioned two small samples of human bones were ethically sourced from the college's human anatomy lab permissible by the professor. Bones were ground into a fine powder using a Dremel tool, demineralised, and then extracted per the Promega kit instructions. DNA was purified by ethanol precipitation and evaluated using agarose gel electrophoresis. While DNA was observed in lanes 3, 5 and 6, corresponding to the control pig scapula, human molar, and control pig innominate, the older, more degraded field bones of presumed porcine origin did not maintain stability during the extraction procedure, where DNA was not obtained. This suggests weathering and taphonomy may influence the survivability of bone-extracted DNA. PCR using human integrin bone sialoprotein II (IBSP) will be completed to determine if there is cross-reactivity between the human IBSP locus and the DNA of the closely related species, pig.

Predicting students academic performance using various ML models

Mr. Jonathan Mata[1], Mr Jonathan Wu[1], Mr Joel Cruz[1], Mr. William Mirabella[1], Mr. Patrick Farrell[1]
[1]Suffolk County Community College

Afternoon Poster Session- A2, Fine Arts Lobby, April 26, 2024, 1:45 PM - 2:45 PM

Artificial intelligence has become one of the most important technologies of our generation; it will inevitably solve the world's problems. We used this technology to identify students at risk of failing computer science classes based on previous students' grade data. Our research shows you the different effectiveness of multiple machine learning algorithms on predicting at-risk students. Specifically, we compare the effectiveness of four AI models: Naive Bayes , K-Nearest Neighbors (KNN),Linear Regression , and Logistic Regression. To achieve this research work, we collected grading related data of the course in the past two years collecting 150 entries containing relevant student attributes such as homework, quizzes, exams(till midterm) ,and early project grades to predict final grade in the early stages of the school year. Through meticulous feature engineering and data preprocessing, we ensure the dataset's suitability for model training and evaluation. Implementations of each AI models are constructed using Scikit-Learn or handmade. We found by splitting the data by 33% for testing and the other 66% for training that Linear regression gave us an accuracy of about 90 % while Naive Bayes gave us 64%, K-Nearest Neighbors about 74%, and logistical regression 92% .Our job is to evaluate which model performs best under certain conditions or for a specific task of these models on our dataset, giving us insights into the strengths and weaknesses of different AI algorithms on predicting student performance in introductory computer science classes. Additionally, our findings provide actionable information for educators and students to enhance learning outcomes by identifying significant factors influencing academic success. Overall, this research contributes to the advancement of AI-driven educational analytics and underscores the potential of leveraging machine learning techniques to support students in reaching their highest potential in computer science education.

Double-Detonation Modeling of Type Ia Supernovae

Ryan Brady[1]
[1]Stony Brook University

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

Computational astrophysics serves as a powerful tool in helping us understand the universe. By utilizing advanced techniques, we can investigate the behavior of celestial objects such as stars, galaxies, and black holes, and explore their interactions, evolution, and fundamental properties. In our research, we use the AMReX and Castro stellar hydrodynamics simulation codes to study double detonation Type Ia supernovae. In the double detonation model, a detonation begins in the accreted helium layer on the surface of a low mass white dwarf, driving a compression wave that converges at the center and ignites the carbon-oxygen core. Castro solves the compressible Euler equations and general stellar equation of state over time, simulating the hydrodynamic interactions and nuclear reactions that occur during the supernova explosion. Our aim is to assess the likelihood and characteristics of a double detonation based upon various initial factors such as chemical composition, core and accretion layer masses, initial helium explosion parameters, and simulation spatial resolution. Notably, we find that our codes replicate the results of the previously published scientific literature at coarser spatial resolutions, which can potentially save computational cost for future researchers. This work is supported with funding from the National Aeronautics and Space Administration (NASA) and the NASA New York Space Grant Consortium.

Brain evolution in threespine stickleback fish (Gasterosteus aculeatus) from recently transplanted and long-established lake populations in Cook Inlet, Alaska

Kinza Yasmeen[1], Dr. Peter Park[1], Dr. Michael Bell[2]
[1]Farmingdale State College, [2]University of California Museum of Paleontology

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

This project analyzes brain evolution in lake populations of Alaskan threespine stickleback (Gasterosteus aculeatus) that were recently founded by sea-run stickleback. Stickleback are a small fish species that have a life cycle much like salmon, where they are born in freshwater, travel out to sea to mature, and then return to freshwater to breed. Sometimes, when stickleback return to freshwater, they will breed in lakes which may get landlocked, after which the sea run forms evolve into freshwater forms over many generations. Several lakes in southcentral Alaska have been recently founded by sea-run populations - some naturally founded and some founded intentionally introduced by humans. This study explores the impact of time on stickleback brain evolution because these newly transplanted stickleback populations are recent and have known founding years. For this study, samples were collected from Loberg Lake founded in 1985, Cheney Lake was founded in 2009, Warfle Lake founded in 2019, and two lakes along Seward Highway (one founded in 1914 and the other in 1966). A sea-run ancestral population (Rabbit Sough) and a pair of long-established lake populations (likely thousands of years old), were analyzed to provide context for any trends in brain evolution discovered in the “new” lake populations. More broadly, this project seeks to explore patterns and rates of change in brain evolution that can be generalized to other fishes.

The Effect of Low-Intensity Vibration (LIV) on the Proliferation and Exhaustion of T-Cells

Ankur Sikder[1]
[1]Stony Brook University

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

CAR-T therapy is a promising immunotherapy that reprograms a patient's T-cells to target cancer. Importantly, the average age of cancers that CAR-T therapy is indicated for (DLBCL, follicular lymphoma, etc.) is over 65 years old. This becomes an issue for CAR-T therapy as older patient's T-cells are known to be less functional and less sensitive to activation signals, leading to less functional CAR-T cells upon reintroduction to the patient. Issues of exhaustion, decreased proliferation and impaired effector function are common in these impaired cells. The sensitivity of these cells is a critical factor, and both T-BET and ß-Catenin play pivotal roles as important intermediaries in the T-cell activation pathway. The Chan/ Rubin lab has focused on the mechanosensitivity of mesenchymal stem cells (MSCs) for over 30 years. Previous studies have shown that mechanical stimulation of MSCs improves the proliferation of MSCs and recent data from the lab indicates a similar effect in T-Cells as well as a reduction in PD-1 expression. This pilot study was conducted to assess the effect of low-intensity vibration (LIV) on the proliferation of T-cells in elderly patients. To test this, whole blood from the Stony Brook Blood Bank was isolated from 2 individuals (aged 23 and 65). Each of these samples were divided into control and LIV groups. All T-Cells were treated with IL-2 (10ng/mL), CD3+/CD28+ DynaBeads (1:10, DynaBeads:Cells)The experimental LIV group was exposed to LIV stimulation (0.7 g; g = 9.8m/s2, 30Hz for 1 hour twice daily with a two-hour rest period) for 5 days while control group was sham handled. Real-Time rtPCR of the T-BET gene was performed on day 5 with a GAPDH endogenous control. In the older patient sample, there was a 57% improvement in proliferation, in the younger patient sample there was an inconclusive change in proliferation. Furthermore, T-BET expression analysis suggests that there is no significant change in the expression of T-BET between Control and LIV groups. This pilot study indicates LIV may represent a method to improve proliferation of T-cells in patients older than 65.

Cucurbit[7]uril's Binding Mode to Aspartame: Understanding Interactions with an Artificial Sweetener

Sanjana Lodha[1], **Amna Khan**[1]
[1]Suny Polytechnic Institute

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

The ability to encapsulate tiny guests more effectively and selectively has made it possible to create multi-component supramolecular aggregated designs that are dynamic and regulated for a range of purposes. The increasing complexity of drugs in the pharmaceutical and medical world today has led to a greater need for these aggregated chemicals to assist in drug delivery. This research looked at the macrocycle molecule cucurbit[n]uril (CB[n]), a polymer of glycoluril, and its ability to bind to other common drug molecules, and further analyzed its potential to deliver drugs to specific targets. The structure of CB[n] is ring-like, similar to a pumpkin, with a hydrophobic inner cavity. CB[n] have a high affinity for cationic compounds due to the carbonyl groups that line the cavity. All these features contribute to the host guest interactions CB[n] participates in, which is particularly appealing when it comes to considering drug molecules as the guest. Initially, a list of 7 drug names were compiled, and researched to test the theoretical solubility quotient with CB [n]. By using Nuclear Magnetic Resonance (NMR) spectroscopy, the biological properties and chemical shifts of CB[n] and other drug molecules were compared to test their degree of interaction with each other.

Moiré formed by heterogeneous structures composed of graphene and hBN under stress

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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

The burgeoning field of condensed matter physics has been significantly enriched by the exploration of superlattices in two-dimensional (2D) materials, particularly through the study of moiré patterns formed by the stacking of graphene and hexagonal boron nitride (hBN). These patterns, characterized by their unique ability to modulate electronic properties, hold the potential to unlock a plethora of quantum phenomena, including the enigmatic Hofstadter Butterfly effect and the emergence of isolated energy bands. This research proposal aims to delve into the intricate world of moiré superlattices, focusing on the potential of these patterns to herald a new era of superconducting materials.

Our methodology revolves around the precise selection and stacking of graphene and hBN flakes, followed by an innovative process of transferring these stacks onto a flexible plastic substrate. By mechanically bending this substrate, we propose to manipulate the moiré patterns, thus facilitating a novel approach to study their impact on the material's electronic properties. Through the application of tension, we aim to enhance the visibility and measurability of quantum effects, employing electrodes attached to the stack to observe the electronic behavior under various conditions, including low temperatures and high magnetic fields.

The significance of this research transcends the realms of fundamental physics, promising implications for the development of advanced electronic devices and quantum computing technologies. By pioneering a method to alter the characteristics of moiré patterns, this study not only contributes to our understanding of emergent electronic behaviors in 2D materials but also paves the way for exploiting these phenomena in practical applications. Through this exploration, we anticipate revealing new insights into the quantum world, potentially unlocking groundbreaking technologies in electronics and beyond.

The Breakthrough for Unseen Students

Milan Gayle[1]
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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

There are many underrepresented students in college who feel invisible on campus, as if they do not belong. Albright and Hurd define an underrepresented student as “historically underrepresented racial/ethnic minority students, first generation college students, and students from lower socioeconomic status backgrounds” (p.258, 2018). It is important for these students to find supportive communities as underrepresented students are at a disadvantage. This will impact their classes because as a college student it is important to stay on track with your school work. Disadvantages such as, but not limited, economic disparities and a sense of belonging impact Black, Indigenous, Person of Color (BIPOC). This is where having a mentor can have a big impact on these students going through all these obstacles while transitioning into college. Although it is okay to not know what you want to do when you first come into college, it is important that you try to get a mentor from your first year as a college student, so you start your college experience off right. When looking for a mentor, you want someone that is going to express care, motivation, and even try to educate students on some of the mistakes they made. This study examines the impacts mentors and representative communities can have for students through a literature review.

Fluoxetine (Prozac) effects on serotonin levels within Drosophila melanogaster brains

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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

Stress is one of the leading environmental factors inducing behavioral and physiological changes in animals. For example, laboratory animals can express anhedonia under stressful conditions, decreasing locomotion, or the ingestion of food. The reversal of stress-induced behavioral responses in laboratory animals can be used to learn about antidepressant mechanisms of known or new pharmacological agents. Laboratory studies of behavioral effects of antidepressants to date have mostly evaluated vertebrate animals, mainly rodents. Initiatives to diminish the use of vertebrate animals in medical research are becoming increasingly popular. Alternative research methods include in silico studies and the use of invertebrates. For instance, the use of Drosophila melanogaster has been validated within different biological fields. Despite being phylogenetically distant species, many mechanisms are conserved between flies and humans. Nevertheless, the use of D. melanogaster in studies of behavioral effects of antidepressants is not as fully established as in rodents. Thus, the current study aims to describe the effects of antidepressant Prozac treatment on behavioral responses of male and female D. melanogaster exposed to chronic, unpredictable, variable stressors. Chronic mild stress (CMS) is considered a naturalistic model of depression because it induces a generalized decrease in responsiveness to rewards, comparable to anhedonia, reversible by chronic treatment with a wide variety of antidepressants.

Assessing the Thermal Conductivity, Moisture Transport, Fire Resistance and Mechanical Properties of Hempcrete

Glenda Rodrigues Santos Giordani

Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Hempcrete, a sustainable building material composed of hemp shiv, lime, and water, presents a promising eco-friendly alternative to traditional insulation. Recognized for its carbon sequestration capabilities, hempcrete effectively absorbs CO2 over its lifecycle. This study evaluates hempcrete's thermal conductivity, moisture transport, fire resistance, and mechanical properties through a series of controlled experiments and modeling to ensure its viability as a sustainable building material. The hypothesis is that hempcrete can deliver effective thermal insulation and moisture regulation, withstand fire, and sustain mechanical loads in building applications. Our objective was to validate hempcrete's performance and solidify its thesis as a superior alternative to traditional materials.

Our multifaceted methodology began with the assessment of thermal conductivity through heat conduction tests in a controlled environment. Each sample had an embedded AC/DC 12V 200°C heating element, which underwent a current test. Data collection was collected by a 4-channel K-type thermometer. For moisture transport evaluation, we exposed the blocks to constant humidity, and Arduino-synchronized thermistors acquired the data. Fire resistance testing involved direct high-temperature exposure of the blocks, using a thermal camera to collect thermal data, followed by visual analysis to assess material integrity. The mechanical properties were examined through compressive strength tests on an INSTRON machine with a 150KN capacity, simulating standard loading conditions on hempcrete at a compression rate of 0.25mm per second, to determine the material's Young's modulus.

Our results underscore hempcrete's superior thermal insulation, evidenced by a thermal conductivity of 0.0911 W/m K, and robust mechanical strength, indicated by an average Young's modulus of 6MPa. Additionally, its resistance to moisture and fire underscores its potential in ensuring building safety. These attributes are crucial for its use in insulating infill walls.

The significance of this work lies in its comprehensive experimental evaluation of hempcrete's performance, offering a data-driven affirmation of its suitability for sustainable construction. The current state of the project indicates that, with further optimization and scalability considerations, hempcrete could revolutionize the construction industry by providing an eco-friendly, carbon-negative, and energy-efficient alternative to conventional materials.

Comparing the sustainability of a SCOBY-based composite and a PVC-based material

Ms. Sanskriti Poddar[1], **Ms. Ida Oestrich**[1], **Vaishali Jain**[1]
[1]Fashion Institute of Technology

Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Sustainability and conscious choices in the fashion industry have become the need of the hour. We need textile materials that are not petroleum-based as they have repeatedly failed to be biodegradable causing major microplastic pollution all over the world. PVC is one of the most widely used synthetic polymers by the apparel industry for jackets, boots, and pants. PVC stands for Poly Vinyl Chloride and its polymer was manufactured and produced in the 1920s for fake leather, which was marketed as vegan leather. The fashion industry has tried to tie loose ends by using PVC as a cheap substitute for animal leather, which unfortunately is not environmentally friendly. A SCOBY composite on the other hand is a material that can be produced and utilized as faux leather. SCOBY stands for Symbiotic Culture of Bacteria and Yeast, and is a key ingredient used in the fermentation and production of kombucha tea. The SCOBY composite studied in this research was prepared using SCOBY as one of the five layers that went into the manufacturing of the composite. The SCOBY takes the shape of a gelatinous mat, and when it's dried out it somewhat resembles leather. In this research, we explore how the SCOBY composite prepared by the TDM department in FIT compares to a PVC material in its properties such as tensile strength, seam strength, abrasion resistance, tearing strength, Differential Scanning Calorimetry, CLO value, and decomposability in soil. Further, the two materials were observed under the scanning electron microscope.

Ciliary Proteomics: Identification of Novel Chibby-Interacting Proteins in Human Ciliated Cells

Mr. Jason Benitez[1,2]
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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

Abstract: Cilia are evolutionarily conserved microtubule-based structures that function in various essential biological functions, such as intracellular signaling. Ciliary dysfunction is associated with a growing class of disorders termed ciliopathies and includes diseases such as asthma, chronic obstructive pulmonary disease (COPD), and primary ciliary dyskinesia (PCD). Chibby (Cby), a 15kDa evolutionarily conserved protein from flies to humans, plays a crucial role in the formation and function of cilia. Cby knock-out mice display several hallmarks of ciliary defects, including chronic upper airway infection, infertility, and polycystic kidneys. TTC23 and TTC23L were isolated as putative binding proteins of Cby. We investigate the protein-protein interactions that are required for ciliogenesis. We confirm interactions and investigate the importance of those proteins in cilia formation and function. Understanding pathways and proteins required for ciliogenesis can help alleviate ciliopathies. We show western blot-based validation of two novel Chibby-interacting proteins in human ciliated cells.

Algae v. Kerosene

Sangeeta Lillman[1]
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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Title: Algae v. Kerosene

At some point, there will be a depletion of fossil fuels and renewable energy will be the only source of energy. It is noted that due the exponential increase in population, the demand for travel, particularly air travel is at an all-time high. With this demand, there come as cost to our environment's rate of carbon emission. Jet A fuel, predominantly used powered by kerosene, is extensively utilized in commercial and military aviation. One of the most significant sustainable alternatives to kerosene in said fuel, being studied is algae, primarily it's exchange in the aviation industry. Algae is one of the leading crops being studied due to its versatility, its ability to be cultivated in different environments, and high growth rate. This research is a comparative study of the two aviation fuels which will ultimately demonstrate the environmental advantages of using algae-based fuel outweighs its disadvantages. The primary focus is to investigate the amount of carbon emission produced by each fuel throughout their life cycle, factoring in the extraction, harvesting and utilization of both fuels. Additionally, it delves into the potential future economic and political ramifications, outlining the necessity of supportive policies to facilitate the adoption of sustainable aviation.

DNA Barcoding for the Detection of Invasive Species in the Hudson River

Elizabeth Hamwey, **Ms. Shalini Varma**[1], **Alicia DiNovo,** Jack H Klemke, David Richardson, Justin Zito, Jennifer McNair, Dylan G Babcock,
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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

The Hudson River faces an escalating threat from invasive species that can significantly impact its ecological balance and reduce biodiversity. This study focuses on employing DNA barcoding as an innovative and precise method for the detection of specific invasive species, including round goby (Neogobius melanostomus), water chestnuts (Trapa natans), hydrilla (Hydrilla verticillata), didymo (Didymosphenia geminata), zebra mussels (Dreissena polymorpha), and grass carp (Ctenopharyngodon idella).By harnessing genetic material released by organisms into their environment, eDNA provides an efficient means of monitoring aquatic ecosystems for the presence of targeted invasive species. Field samples, encompassing water and sediment, are collected from distinct locations along the Hudson River. DNA is extracted from the collected samples, and the mitochondrial cytochrome c oxidase I (COI) gene is targeted for polymerase chain reaction (PCR) amplification. Subsequent DNA sequencing and bioinformatics analysis enable the identification of invasive species through comparison with established genetic databases.This molecular approach not only ensures the accurate identification of targeted invasive species but also provides valuable data on their distribution and prevalence within the Hudson River. The integration of DNA barcoding into the detection strategy enhances the efficiency of monitoring programs, allowing for early identification and proactive management of invasive species.The findings from this study contribute to a comprehensive understanding of the invasive species dynamics in the Hudson River, offering insights crucial for the development of effective conservation and management strategies. DNA barcoding emerges as a potent tool for advancing the precision and speed of invasive species detection, laying the foundation for sustainable protection and preservation of the Hudson River ecosystem.

What is Cyclic Neutropenia

Ms. Glynnis Rodgers[1]
[1]SUNY orange

Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

The methodology of this research involves a comprehensive review of existing literature, medical databases, and relevant scientific publications. Various sources such as research articles, clinical studies, textbooks, and reputable medical websites were consulted to gather information on cyclic neutropenia. The research focused on understanding the pathogenesis, clinical manifestations, and management strategies associated with cyclic neutropenia. Data synthesis, analysis, and critical evaluation were conducted to present a comprehensive overview of the topic.

Cyclic neutropenia is a rare blood disorder characterized by periodic fluctuations in the number of neutrophils, which are a type of white blood cell responsible for fighting bacterial infections. It falls under the broader category of neutropenias, which are conditions characterized by abnormally low levels of neutrophils in the blood. Cyclic neutropenia is distinct in that it follows a regular pattern of recurrent episodes of neutropenia, typically lasting for a few days. The condition is primarily inherited and is associated with genetic mutations affecting the production and maturation of neutrophils.

What is Cyclic Neutropenia?
Cyclic neutropenia is a hematological disorder characterized by recurring cycles of neutropenia. Neutropenia refers to an abnormally low level of neutrophils in the blood, which compromises the body's ability to fight off bacterial infections. In cyclic neutropenia, these episodes of neutropenia occur in regular intervals, typically ranging from 14 to 35 days. During these cycles, the neutrophil count drops significantly, making individuals more susceptible to infections. Symptoms may include fever, mouth ulcers, sore throat, and skin infections. Cyclic neutropenia is primarily caused by genetic mutations affecting the regulation of neutrophil production and maturation. Treatment options include the use of growth factors, antibiotics, and supportive care measures to manage symptoms and reduce the risk of infections.

Arhtrobacter globiformis NRL B-2880 bacteriophages Isolated and Characterized from local soils in Long Island

Judy Hasan-hafez[1], **Eshal Mohiuddin**[1], **Gabriella Azab**[1], Ms. Zara Kabir[1]
[1]SUNY Old Westbury

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

SUNY Old Westbury joined the 10th Cohort of HHMI SEA-PHAGES in 2017. The phage discovery component was integrated into the general biology I laboratory (BS2401). Herein we report the results of the Phage Discovery component. The course enrolled 15 students. Nine bacteriophages were isolated using an enriched isolation. All of them were isolated from soils in Nassau or Suffolk counties. The phages were isolated and purified at SUNY OW. All of them have a Syphoviridae morphotype with a head and a non-contractile flexible tail. One of them, Turab, was sequenced at the University of Pittsburgh. It is a temperate phage 43,119 base pairs long, and 66.9% GC content and it belongs to the AZ1 cluster. It was isolated by Gabriella Azab and Verina Anis from soil from a garden on campus. It forms plaques of 3.6 ± 0.55 mm in diameter and a titer of 2.52 x 10^10 PFU/ml.

Photochemical reactions: a possible route to direct dark matter detection

Qi Ding[1]
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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

Dark matter, a substance discovered by its gravitational effect, has a mysterious nature. With various proposed models, the potential mass range of dark matter particles spans widely, necessitating comprehensive detection efforts. In this poster, we present a novel approach targeting the lighter mass range of dark matter particles. The main idea is to use a controlled photochemical reaction for direct detection of dark matter particles. Dark matter particles could excite the transition between two conformers of a molecule causing a photon emission after de-excitation. In this scenario, azobenzene emerges as an optimal candidate due to its simplicity and well-understood nature, coupled with a vanishing barrier between its two conformers during isomerization, triggered by light energy fluctuations. Presently, our focus lies on accurately computing the isomerization process. Employing quantum chemistry at the density functional theory level, we map the molecule's potential energy surface, identifying transition states in both solvent and gas phases, which would be the key to understanding the process. Future steps involve identifying transition states in both gas and solvent phases and simulating dark matter interaction with azobenzene.

The Mathematical Beauty of the Golden Ratio and the Metallic Means

Ms. Udya Dewanamuni[1], **Saramichele Isidore**[1]
[1]Suffolk County Community College

Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

The concept of the Golden Ratio, symbolized by the uppercase Greek letter Phi (Φ), has long fascinated mathematicians, artists, and scientists alike due to its pervasive appearance in nature, art, architecture, and even financial markets. This research delves into the mathematical foundations underlying the Golden Ratio, exploring its connection with the quadratic formula and the Fibonacci sequence, and extending the discussion to the broader family of Metallic Means. The investigation begins by explaining the derivation of the Golden Ratio, $\Phi = (1+\sqrt{5})/2$, from the equation $x^2 - x - 1 = 0$. The Fibonacci sequence reveals the connection between Fibonacci numbers and Phi. Expanding beyond the Golden Ratio, Metallic Means, enclose a family of irrational numbers obtained from generalizing the quadratic equation initially used to derive Phi. Each Metallic Mean is represented as a solution to $x^2 - px - 1 = 0$ (where p is a positive integer) and exhibits unique properties and relationships reminiscent of the Golden Ratio. In our research, we will highlight the fundamental role of quadratic equations and the Fibonacci sequence in understanding the Golden Ratio and extend this understanding to the broader context of Metallic Means. By dissecting the mathematical structures that underpin these ratios, the research illuminates the universal principles of harmony, proportion, and continuity, offering a deeper appreciation for the elegance and correlation of mathematical phenomena.

“Wealth and Happiness: A Global Perspective”

Lamyaa Hamid[1]
[1]SUNY Westchester Community College

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

By analyzing the most recent data from the annual World Happiness Report, this presentation will explore to what extent a country’s economic advancement affects the happiness and life satisfaction of the citizens. In its totality, the report does seem to indicate that the happier countries are those that are more economically prosperous and politically stable. However, a closer look at the WHR ratings reveals that the situation is more complex. This will be illustrated through a comparison of six countries – Finland, the United States, the United Arab Emirates, Jordan, India, and Afghanistan. In this group, only Afghanistan shows a direct correlation between a GDP and a happiness ranking. In the case of the other five countries, such a correlation is absent. For example, the happiness ranking of the United States does not match how high its GDP levels are, and despite having the second highest GDP on that list, India ranked below the United Arab Emirates and Jordan. Data related to the Gross National Income (GNI), which looks at an estimate of the average salary in a country, reveal similar discrepancies. The presentation will examine what other factors play a role in reported perceptions of happiness and how this information should be utilized in the ongoing efforts to foster global prosperity and economic equity through international business initiatives.

Academic Mindset, Behaviorism, and Self-Advocacy in Students Confronting Academic Hurdles

Ms. Shakira Shakur

Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

This research delves into the intricate relationship between academic mindset, behaviorism, and self-advocacy among students grappling with academic challenges. The objective is to scrutinize these factors, identifying areas for enhancement and crafting interventions to cultivate positive behaviors conducive to self-advocacy.

The study examines specific factors elucidated in the Learning and Study Strategies Inventory (LASSI) that contribute to the waning academic mindset among students. Based on the LASSI results, a survey was curated to further pinpoint areas necessitating attention. Through targeted interventions tailored to address these factors, the research endeavors to foster positive behaviors and bolster self-advocacy within academic environments.

The insights garnered from this research not only shed light on the complex dynamics of academic mindset, behaviorism, and self-advocacy but also offer a deeper understanding of why students may hesitate to seek help. By examining students' perspectives on barriers to self-advocacy, educators gain invaluable insights into the educational changes needed to foster a supportive environment. This study serves as a compass for educators, guiding them towards implementing tailored interventions that address students' needs and empower them to overcome academic hurdles. With a clearer understanding of student perspectives and challenges, educators can enact meaningful changes that cultivate a culture of support and resilience within educational institutions.

Boron Isotope Analysis of Algaes and Angiosperms in Setauket Mill Pond

Ms. Callie Zellner[1], Troy Rasbury[2], Katie Wooton[2], Carrie Wright[2], Anastasia Iorga[3], Katheryn Twiss[4]
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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Setauket Mill Pond is spring-fed and located in East Setauket on Long Island, NY. Recent work showed differences in boron content and isotope composition from the inlet to the outlet in the surface waters of Setauket Pond. Not only were there trends, but these trends changed over time. It appeared that growth of algae, which is isotopically light with a very high enrichment factor for boron, might account for the trends in boron. This work focuses on understanding the spatial distribution of boron within the pond in relation to the algae and other plants growing in the area. Algae and water samples were collected throughout and around the Setauket Pond over three sampling trips in September, October, and November. Data on pH and temperature for the location of each sample was collected in order to understand other factors that may contribute to the boron systematics in the pond. Analysis of these plants and their corresponding waters allowed for investigation of plant physiology and the dynamics of the relationship between plants and the waters they grow in. For the aquatic plants, whether algae or angiosperms, there is a profound fractionation of around -15‰ between the plants and their surrounding waters. By comparison, seaweed, which grows in a high boron concentration solution, has on average a -20‰ fractionation from sea water. The boron concentrations in the Setauket Pond are in the low ppb range, while the oceans have 4.5 ppm. The differences in boron isotope fractionation may reflect that freshwater plants cannot be as discriminating as seawater plants because boron is an essential element and when supply is short plants must take more of the boron. This project contributes to an understanding of the influence plants may have on boron in Setauket Pond and other spring-fed ponds.

The Sunchoke Garden Project : A Nutritional Treasure Unveiled — Cultivating Health, Mindfulness, and Resilience

Ms. Carol Mendez[1], **Mr. Sirajuddin Siddiqui**[1]
[1]SUNY Old Westbury

Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Despite its rich nutritional profile and potential health benefits, the sunchoke, a Native American plant, remains largely unrecognized in mainstream diets. This proposal seeks to shed light on the nutritional and therapeutic attributes of the sunchoke, emphasizing its role in promoting digestive health, managing diabetes, fostering mindfulness, and cultivating resilience.

Sunchoke, also known as Jerusalem artichoke, is a powerhouse of essential vitamins, minerals, and prebiotic fiber, particularly inulin, which aids in digestion and regulates blood sugar levels akin to insulin. Moreover, its high fiber content induces satiety, contributing to weight management and overall well-being. By integrating sunchoke into daily diets, individuals can embrace a holistic approach to health and nutrition.

Beyond its nutritional value, incorporating sunchoke into culinary practices fosters mindfulness. By savoring the flavors and textures of sunchoke-infused dishes, individuals cultivate a deeper connection with their food, promoting mindful eating habits and heightened sensory awareness.

At SUNY Old Westbury, sunchoke cultivation is approached with an adventurous spirit, observing its symbiotic relationship with other plants like morning glory. This interplay illustrates resilience and coexistence, offering valuable lessons for students and the community at large. Sunchoke cultivation serves as a form of plant therapy, fostering resilience and adaptability in the face of challenging environments.

Through research, education, and community engagement initiatives, this proposal aims to elevate awareness and appreciation for the sunchoke's nutritional, therapeutic, and ecological significance. By incorporating sunchoke into diets and educational curricula, individuals can unlock its potential to enhance health, mindfulness, and resilience, paving the way for a healthier and more harmonious relationship with food and the environment.

Uranium-Lead Dating of Long Point Limestones

Juliet Slota[1]
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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Uplift of the Colorado Plateau created many notable features such as the Grand Canyon. The timing and reasons for this uplift are still being investigated, and models for uplift are often controversial, with timing estimates ranging from 80 to 6 Ma. On top of the Grand Canyon sequence are rim gravels, whose timing provides a means of testing some models for the Colorado Plateau uplift. Long Point limestones are thought to be lacustrine (lake) carbonates found within the Music Mountain Formation on the Coconino Plateau in Arizona. Notable outcrops that have been previously studied occur at Black Tank, Duff Brown Tank, and Mexican Tank. These limestones, dated by U-Pb isotope dilution in previous studies, are 66-60 Ma (Hill 2016). This project will investigate the duration of the lacustrine system since multiple layers of limestone occur from near the base of the Music Mountain Formation to near the top of the section where they are capped by the 6.76-6.38 Ma Long Point basalt. We will also investigate later alteration, which is seen as two clearly separate groups of data from the Mexican Tank locality. The focus will be on the limestone outcrop at Black Tank because it has a continuous section that is about 30 meters thick, and thus appears to be the most complete record of the lacustrine carbonate formation. Samples were collected at the lower, middle, and upper sections of this limestone. The upper section of Black Tank was dated to 52.99 ± 1.81 Ma, while the reported age is 66.3 ± 3.9 Ma (Hill 2016). Continuing work will evaluate if the lake is this long-lived, or if the upper part of the limestone at Black Tank is overprinted similar to what we found at Mexican Tank.

Fluorite Deposits Associated with Southwest Cordillera Collapse

Caroline Rapp[1]
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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

The collapse of the Southwest Cordillera and the processes associated with it have played a significant role in shaping the current landscape. This region included the stationary and stable Colorado Plateau which was flanked by highlands. The Mogollon Highlands were a region characterized by high-elevation plateaus that existed across what is now the Transition Zone of Arizona. The collapse of the Southwest Cordillera occurred from about 36 million years ago to the present day. The collapse migrated with the initiation and growth of the Pacific-North American plate transform boundary. The migration of this system produced transtensional strain that triggered a collapse, the timing of which is captured in geodynamic models. The Mogollon highlands collapsed between 30-20 Ma with a pattern of southeast (older) to northwest (younger) collapse. Fluorite deposits are found across the Transition Zone and we hypothesize that the timing of this mineralization corresponds to the timing of collapse. Fluorite deposits were found in the Jumbo Mine in Central Arizona. Samples are being characterized petrographically and will be dated with U-Pb Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA- ICP- MS). Dating the fluorite deposits will test a hypothesis that fluorite forms during transtensional strain and should represent the timing for the extensional collapse in this specific region. Based on the geodynamic model, we expect these dates to be around 25 Ma.

Fluorite Deposits in the Great Basin Following its Formation

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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Hot springs and geothermal wells in the Great Basin of the Western United States (WUS) have increased fluorine and 3He/4He ratios with a mantle signature. Fluorite (CaF2) is a common fluorine mineral and fluorite deposits in the WUS have a noticeable association with transtensional crustal extension based on geodynamic models (Bahadori et al., 2022). However, the age of the fluorite deposits is inadequately known and based only on proximity to dated volcanic rocks and cross-cutting relationships. Uranium-lead (U-Pb) dating of fluorite with laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS), can test the timing of formation and compare it to the geodynamics model. The geodynamics model shows that as the San Andreas strike-slip fault between the Pacific and North American plates formed and began to move northward, the WUS experienced intense extension which led to the gravitational collapse of paleo-highlands forming what is today the Basin and Range province of the WUS. Diamond Queen Mine is located in proximity to Beatty, Nevada, on the outskirts of Kingman Arch, the junction of the ancient Nevadaplano and Mogollon Highlands topography. Samples from the Diamond Queen Mine contained mineral phases such as fluorite, quartz, feldspars, calcite, and other carbonates. The fluorite from Diamond Queen should theoretically be about 15-5 million years old based on the geodynamics models, which show the topography in the area to collapse around then. We may test the exact dates by using U-Pb dating of the fluorite samples with LA-ICP-MS.

Boron isotope analysis of Phragmites to investigate plant boron physiology

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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

Working to understand Phragmites spp. physiology, we investigated their ability to uptake boron (B) from their aquatic environments. B is a critical element to plant physiology, especially in relation to cellular structure. We collected Phragmites in spring and fall 2023 from three wetlands: Setauket Pond and Flax Pond on Long Island and Plum Island in Massachusetts. Two samples from each of these wetlands were used, and we sampled both leaves and stalks from each sample. Half of each of the samples were leached in 2% nitric acid for 2-3 weeks, while the other half of the samples were ashed in a furnace at 500°C for two hours. The ash samples were then dissolved in 2% nitric acid. Both leached and ashed samples went through B chemistry before instrumental analysis. The results of concentration analysis show Phragmites leaves had a higher concentration of B than the stalks, in both leached and ashed samples. The leached leaves had an average of 6.82 ppm while the leached stalks had an average of 2.86 ppm. The ashed leaves had an average of 131 ppm while the leached stalks had an average of 27.10 ppm. Overall, these data show that ashed samples return a higher B concentration than their leached counterparts. This result indicates there are physiological structures within Phragmites that trap B, making leaching alone inadequate for B extraction. Additionally, preliminary data has shown that there may be an increase in B concentration in Phragmites leaves from spring to fall, indicating seasonal changes in B physiology. In conclusion, of the two methods, leaching vs. ashing, we now know Phragmites need to be ashed for complete B extraction. Also, knowing leaves have the greatest accumulation of B, and that there is seasonal variation, Phragmites B physiology is one step closer to being understood.

U-Pb Dating of Fluorite Deposits at Mammoth Mine, Arizona as an Indicator of the Age of Transtensional Stress

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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

It has been found that elevated fluorine in geothermal systems in the Western United States (WUS) corresponds to transtension. Because fluorite is a common mineral formed from fluorine, the linear distribution of fluorite across the WUS may be evidence for transtention in the geologic past. Prior to 36 million years ago in the WUS, the Farallon plate completely subducted under the North American Plate. This subduction created mountains and orogenic plateaus, such as the Mogollon Highlands which trended southwest to northwest across central Arizona. As the San Andreas fault grew and the Mendicino triple-junction migrated north, the WUS experienced progressive transtensional strain which caused the region to go from a compressional regime to an extensional regime accompanied by gravitational collapse of the highlands. Geodynamic models can be used to predict the timing and position of past transtensional strain. Our lab has developed the application of U-Pb dating of fluorite using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA ICPMS). The Mammoth Mine in Pima County, Arizona is a prime example of a region that lies along the former Mogollon Highlands. Fluorite samples from the Mammoth Mine were collected and then cut and prepared for testing using LA ICPMS. Samples were examined by SEM to verify their chemical makeup and to learn more about each sample. Based on the geodynamics model (Bahadori et al., 2018; Bahadori and Holt, 2019), and our understanding of the relationship of fluorine to transtension, it is suspected that fluorite from Mammoth Mine will date to around 25 Ma.

Towards a Universal Chemical Predictor: Predicting final states of an atom-diatom collision

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Afternoon Poster Session-B2, Fine Arts Lobby, April 26, 2024, 3:00 PM - 4:00 PM

Artificial intelligence is gaining ever more relevance in science and the world at large. The predictive power of machine learning can be leveraged to make data-driven predictions for chemical reactions. This presentation will discuss the use of neural networks to predict the final ro-vibrational state distributions of the atom-diatom collision of calcium and hydrogen; this reaction forms calcium monohydride and is relevant for buffer gas chemistry. Furthermore, the prediction of these distributions will be extended to the reactions of calcium with deuterium and calcium with tritium, the hydrogen isotopes. The simulation of atom-diatom reactions is done with quasi-classical trajectory (QCT) simulations that evolve the system classically and assign states semi-classically. The large computational cost required by such simulations to cover the initial state space of the reaction necessitates other computational methods, namely machine learning, to help better understand optimal reactive conditions. Neural networks were trained using QCT simulation data to predict the final rotational and vibrational state distributions. The target distributions have the advantage of characterizing the population of the rotational and vibrational states of the product diatom while simultaneously providing the probability of a reactive process to occur for a given initial state. The featurization of the models includes information about the initial state and the reactant molecule. We show that with this featurization, the reaction of calcium with hydrogen along with its isotopologues can be described in terms of their final ro-vibrational state distributions using neural networks. One particular goal of this project was to design a neural network to learn the isotopic effects of the reaction, which meant learning all three reactions simultaneously. Thus, we demonstrate that it is possible to make predictions for the final state distributions of the reaction of calcium with deuterium after only training a neural network model on the reactions with hydrogen and tritium as the reactant diatoms. Efforts to develop models applicable to different reactions and that can generalize between multiple reactions simultaneously bring us closer to a universal chemical predictor.

Multi-Year Study Of Salt Marsh Nekton Composition Across Marshes At Different Stages Of Restoration

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Afternoon Poster Session-B1, Sagtikos Lobby 1st floor, April 26, 2024, 3:00 PM - 4:00 PM

During the summer of 2021 and 2022, nekton surveys were conducted at four salt marsh sites in Suffolk County, NY to evaluate the efficacy of coastal resiliency restoration efforts. Marsh restoration aimed to facilitate increased water exchange throughout the marsh. An indicator of restoration success is increased Mummichog (Fundulus heteroclitus) abundance. Fish and invertebrate abundance were measured monthly using minnow traps at sites with varying levels of restoration. Results from 2021 show a monthly change in nekton communities across all salt marsh sites, with overall increasing species richness as summer progressed, and a positive correlation between proportional abundance of mummichogs with restoration level. Trends significantly differed in 2022; species richness decreased as summer progressed and killifish abundance varied with month and restoration level. Larger quantities of other killifish species (rainwater, spotfin, striped) and fewer invertebrates, eels and other juvenile fish were caught in 2022 compared to 2021. Changes in nekton composition may be the result of dryer marsh conditions and occurrences of extreme salinities (>40ppt) due to less summer precipitation in 2022.

Boron Uptake in Common Garden Vegetables

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Boron has been known to play a critical role in the growth and development of many terrestrial plants but the way it can be supplemented for the benefit of the crops and the environment has yet to be fully understood. This research focused on the utility of seaweed as a fertilizer. Seaweed from three contexts, Moriches Bay, East River, and Ulva, were tested along with miracle grow and a control that did not have any fertilizers added. Plots of land at the Southampton Campus of Stony Brook University were used to grow carrots, tomatoes, and spinach and this study examined boron uptake and isotope compositions to compare seaweeds to other fertilizers. This research has shown that seaweed is a great supplement for boron as it has been seen to contain a good amount of boron when it is incorporated into the soil. The control soil had 1.6 times less boron than the East River and this relationship was seen in the plants' uptake in boron. The Moriches Bay and Ulva had similar amounts of boron but the plants were not seen to have an increase in the uptake of boron. Furthermore, the vegetables seem to have an increased boron intake by the plant when seaweed is in the soil as opposed to fertilizers or unamended soil. Though polluted, the East River was enriched with boron and the plants' intake also increased as compared to the other environments. Embracing a holistic approach, this research aspires to pave the way toward a more sustainable agricultural future, where boron supplementation is integrated into cultivation practices for the benefit of both crops and the environment.

Creating a Cybersecurity Solution to Deal with Zero-Day Attacks

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This research's relevancy is to determine a cybersecurity solution capable of dealing with zero-day attacks. Typical cybersecurity solutions require regular updates, and thus are susceptible to zero-day attacks. This is because zero-day attacks lack a pattern that cybersecurity solutions' detection methods do not recognize. Two possible solutions to this problem lie in data science and data mining. In particular, data mining can identify unusual patterns. What components will be required to create a cybersecurity solution suited towards dealing with zero-day attacks? Components for a cybersecurity solution suited towards dealing with zero-day attacks include data mining algorithms, discretization methods, a data mining methodology, and an intrusion detection model. Articles were analyzed in order to determine which components were optimal for this evidence-based cybersecurity solution. The KDD process methodology was the selected methodology for the proposed solution. Rather than defining a problem, it creates a data set instead. Regarding a data mining algorithm, decision tree algorithms had the highest amount of correctly classified instances and the lowest amount of incorrectly classified instances. They also contained discretization methods similar to entropy minimization discretization. Finally, for the instruction detection system model, an anomaly-based model was chosen due to its ability to detect new attacks. This research can present new findings in how to improve cybersecurity by finding a reliable way to deal with zero-day attacks.