



CENTRAL

URCAD 2024

Program

URCAD 2024 Schedule of Events

1:00 pm – 3:00 pm

Oral Presentations

Philbrick Room 120 and Sprague Carlton Room (Student Center)

2:00 pm – 4:00 pm

Poster Session

Alumni Hall (Student Center)

Research Award Winners: Congratulations!

URCAP Research Award

Zhané Kelly

Psychological Sciences - Carol Ammon College of Liberal Arts & Social Sciences

Project: *The Role of Stereotype Threat in Classroom Participation Among African American Women*

Olga Veselova, Kiara Azarigian, Benjamin Combs, and John Massaro

Computer Science - School of Engineering, Science & Technology

Project: *Enhancing Human-Robot Interaction: VR Control with Manus Gloves and Unity 3D*

Elihu Burritt Library Undergraduate Research Award

Graduate: Haley M. Kolesnik

Thesis: *The Effects of a Classroom-Based Physical Activity Intervention on Attention in 6th Grade Students.*

Undergraduate: Arianna L. DiNapoli

Paper: *Acne vulgaris and stress in adulthood.*

Poster and Oral Presentation Abstracts

Undergraduate Level Posters

School of Business

#37 Tali Arce (Finance)

Importance of Roth IRAs in Building Retirement Wealth

The Roth IRA, when used wisely from a young age, is crucial for building wealth for retirement. This paper contrasts the unique tax advantages of the Roth IRA with other retirement accounts, such as the Deductible IRA and the 401(k), highlighting its advantage for long-term wealth accumulation. A historical overview outlines the evolution of saving for retirement in the United States, from a period when citizens relied on pensions and Social Security to build retirement wealth, to the introduction of the Individual Retirement Account (IRA) in 1974. This account marked the beginning of many more retirement accounts to come. Furthermore, this overview also captures the ongoing changes in policies and contribution limits that continue to impact retirement planning to this day. While the Deductible IRA was the first account to provide citizens with a direct way to invest for their retirement this paper highlights the Roth IRA's unique position in the retirement planning landscape.

The most important factor when building wealth for retirement is time, the longer someone's time horizon the more compound interest will work in their favor. Case studies such as the analysis of the \$5 billion Roth IRA shed light on underutilized strategies employed by the affluent to build retirement wealth. To illustrate the best retirement account for each person this paper analyses the financial situation of three people at varying stages of their career to find what retirement account is best for them. Typically those who are younger and starting in their career will benefit most from the Roth IRA while those near the peak of their career and retirement benefit more from deductible retirement accounts.

#49 Nathan Hinckley (Management)

Impact of COVID-19 Pandemic on the Adoption of Technology in Small and Medium Businesses

Small and medium businesses (SMBs) have significantly altered their operational methods compared to five years ago. The COVID-19 pandemic was a major factor in this shift, as it led to revolutionary technological changes in response to a significant disaster. Driven by concerns over virus transmission, these businesses implemented new strategies, such as online delivery services, virtual meeting spaces, and innovative payment methods. Despite the termination of the federal Public Health Emergency (PHE) declaration for COVID-19 in May 2023, SMBs continue to employ and expand the use of technologies developed during the pandemic. This study focuses on SMBs along the East Coast of the United States, examining their operational shifts pre- and post-COVID-19, as well as the ongoing technological transition. Preliminary findings based on empirical data indicate that while the pandemic initially increased SMBs' reliance on technology, the continued escalation in technology use in 2023 suggests that other factors, such as competition and convenience, may also be driving this trend.

#34 Victoria Violette (Finance)

Government Relief for Impacts on Institutions Cause by COVID-19

The goal of this paper is to delve into the relationship between the COVID-19 pandemic and universities in America. COVID-19 took an immediate toll on the reality of college in America, students were sent home and unsure about what the future holds regarding their education. This uncertainty led to increasing dropout rates, rising prices, and shifts in college operations in the United States that are still seen today. With these factors growing and becoming more predominant, it was evident that universities were struggling to sustain a healthy financial status. The revenue from student tuition and everyday operations was no longer a source, and therefore colleges had to resort elsewhere.

To keep the education of students alive, Donald Trump's Administration stepped in. Government intervention played a critical role in the survival of the higher education system, providing nearly \$70 billion in total for university use (NASFAA 2021). This money was specifically meant for anything COVID-19 related, predominantly helping the impacts on operations and student aid. This compensation was referred to as the Higher Education Emergency Relief Fund: HEERF I, HEERF II, and HEERF II. With the help of this funding, universities were able to navigate COVID-19 and provide online learning options. If it wasn't for the step-in of the Government through emergency relief funding during the COVID-19 pandemic, universities would have continued to struggle and drop out rates would have continued to increase. Students in America would have been at a loss of knowledge and left without the ability to obtain a higher education. The future of education in America would have been in a critical state and the college students of the time would have been left behind.

#65 Victoria Violette (Finance)

Higher Education Relief Funds During COVID-19 Crisis

The COVID-19 pandemic directly impacted all economic sectors and disrupted higher education at the global level. Due to increased uncertainty and high risk to individual safety, the total undergraduate enrollment had dropped by 1.4 million, and student tuition was no longer a predictable source of revenues. Government intervention played a critical role in the survival of the higher education system, by providing funding of nearly \$76.2 billion (U.S. Department of Education 2023), through programs referred to as the Higher Education Emergency Relief Fund: HEERF I, HEERF II, and HEERF II. This thesis provides an overview of HEERF programs that allowed universities to navigate the COVID-19 pandemic and provide students with a path to complete their education.

Carol Ammon College of Liberal Arts & Social Sciences (CLASS)

#32 Celia Acosta-Fuentes (Psychology)

The Role of Perceived Love Language Understanding and Romantic Attachment Style on Intimate Relationship Satisfaction

The five love languages theory created by Dr. Gary Chapman has started to gain popularity in recent years and is proposed to play a role in relationship satisfaction by many researchers like Mostova, Hughes, and Guy-Evans. The romantic attachment theory adapted by Hazan and Shaver (1987) also proposes that the attachment style one takes on in their romantic relationships plays a role in relationship satisfaction. This study aimed to see if there is a relationship between perceived love language understanding and romantic attachment style on relationship satisfaction in citizens from the United States of America. I hypothesized that (1) if one feels that their preferred love language is being understood and satisfied by their partner, then one will experience higher levels of relationship

satisfaction (2) If one's attachment style is anxious-avoidant, then one will experience higher levels of relationship satisfaction than someone of anxious-resistant style. A Pearson's r correlation was used to determine if there is a relationship between perceived love language understanding and relationship satisfaction. An independent samples t -test was used to explore the impact of romantic attachment style on intimate relationship satisfaction.

#17 Arianna Antonakos (Sociology)

How Billionaires Hurt The Rest of Us

A collective consciousness around the billionaire class has become increasingly more prevalent over the last decade. People have begun questioning the enormous wealth accumulated by billionaires and whether or not billionaires are harmful to larger society. In fact, people have begun questioning whether or not billionaires should exist at all. At the expense of the working class, billionaires and corporations have corrupted the government and its politicians. Politicians and those in positions of power should not be able to be bought out by billionaires and corporations at the expense of the majority. We are all affected by corporate greed. This emerges in a myriad of ways; a lack of investment in public life, a lack of social programs, stunted wages and prolonged work hours, and simply not being able to afford and maintain a quality, healthy life. A wealth class that is a relatively new phenomenon, what do billionaires cost the rest of us?

#50 Isyss Blanco (Psychological Science)

The Effects of Avid Reading on Perceived Quality of Life

While reading is necessary to produce innovative ideas, build connections, and become more discerning of individuals and society, it is also a pastime used to decompress and relieve stress. In certain instances, avid reading can be described as a habit like yoga, meditation, and exercise as a tool to strengthen the mind and overall state of being. The effect of avid reading on quality of life is notable in that it can open the discussion for more research to explore hobbies and leisure activities individuals can implement into their lives to improve their standard of living. This study aimed to compare those who engage in avid reading to those who do not view it as a fulfilling hobby to determine if leisure reading significantly affects an individual's outlook on life. Using the Self-Determination theory, it was hypothesized that avid readers would have a statistically significantly higher perceived quality of life than non-avid readers. The results of this study will be used to analyze the significance of independent reading and its effect on how individuals interpret the status of their well-being or satisfaction with life as well as other hobbies that might contribute to a greater sense of well-being more than independent reading.

#25 Ashley Carter (Psychological Science)

What Does Your Emotional Intelligence Tell You About Your Academic Success?

Academic success has historically been used as the measurement of student intelligence. Students, parents, schools, and even the government use GPA as the sole indicator of academic success. In the past two decades, the term emotional intelligence (EI) has caught the interest of many psychologists as a possible indicator of academic success. However, very few studies have considered the influence of EI on academic success in university-aged students. The purpose of this study is to explore the relationship between EI and academic success to ultimately determine if EI is a predictor of academic success. EI theory refers to the emotional intelligence of an individual concerning personal, social, and academic domains. This current study examines the relationship between GPA, stress, and the ability of EI to predict academic success using self-reported GPA, the Perceived Stress Scale (PSS-10), the Schutte Self Report Emotional Intelligence Test (SSEIT), and the Subjective Academic Achievement Scale (SAAS) in a population of undergraduate and graduate college students in the USA. Based on a theoretical framework of EI, it was hypothesized that EI, and a combination of EI, perceived stress, and GPA were

significantly related and served as predictors of subjective academic success. Correlations, mean difference tests, and regressions were performed. Results will be used to expand the field of research on the topic and as a tool for universities to help college students succeed academically; more specifically, identifying students with low emotional intelligence at risk of poor academic success.

#60 Aliyah Collymore (Psychology)

Attachment styles and relationship satisfaction

Intimate relationships play a vital role for forming connections and communicating with one another. Different attachment styles have an influence on the satisfaction of relationships. The purpose of this study was to understand the connection between different attachment styles and how they shape relationships over time. This study was backed by John Bowlby's attachment theory which states that attachment begins in early childhood experiences and has an influence on an individual's attachment style. This theory was utilized to gain knowledge within different attachment styles and the effects it has on intimate relationships long-term. It was hypothesized that individuals with secure attachment styles were more likely to report higher levels of relationship satisfaction long term. Results will be used to gain knowledge within different attachment styles and the effects it has on relationships in the long run. These results will be used to provide valuable insight to counseling services such as relationship therapy, and counseling services.

#16 Liam DeLaney (Psychology)

Video Games in the World of Art

In this poster, the relationship between video games and the world of art, and the ways that video games stand out amongst other art forms is explored. Video games are a relatively new innovation but have already had a profound impact on our modern world. They have inspired research about the effects that simulated violence can have on us, have changed the ways we engage in physical wellness, and their market has grown into an estimated 217.06 billion dollar industry. Through the overlap of video games with other art mediums and their implementation of metaphors, allegories, and questions of morals, ethics, and violence, they have also changed the world of art. Their interactivity has allowed players to engage in thought-provoking and meaningful experiences in ways that other mediums largely cannot manage. These experiences allow for greater cultural representation and the use of video games in educational fields to teach art and other concepts in new ways. Video games now find themselves at the cutting edge of the artistic world, enabling their designers and users to explore previously unexplored domains and to revisit concepts that have been touched upon by other mediums in entirely new fashions. By accepting video games as an art form, we are allowing the field of art to evolve, and by allowing the field of art to evolve, our methods of expressing ourselves are evolving as well.

#7 Arianna DiNapoli (Psychological Science)

Acne vulgaris and academic stress severity in adulthood

The correlation between psychological stress and acne vulgaris is embraced well by the general population, and widely supported in scientific research. Despite this, acne vulgaris is commonly regarded as a strictly dermatological issue that ceases with the beginning of adulthood. However, this skin disease is not strictly biologically caused, and does not always leave naturally with age. Acne vulgaris is a complicated multifactorial disease with a wide variety of potential triggers and an association with bacteria that continue to resist many methods of treatment. With the relationship shown in research between acne vulgaris and stress, it is possible that the psychology of an individual may be a factor to consider in the future study of acne vulgaris.

#59 Amber Duperry (Psychology)

Optimism, Pessimism, and Success Rates

In a country that prioritizes capitalism, a booming economy, and individuals with money and high status, many people want to encapsulate these standards and attend to all things that could make their person successful, i.e., receiving higher education, working countless hours, and pursuing innovation. Success is considered part of the American dream, and its value is exalted. To meet such an endeavor, however, often results in many tiny successes and failures, and how one perceives, approaches, and goes forth, following each of these digressions, can determine their likelihood of success. How one perceives, approaches, and goes forth regarding events dispositionally can diverge generally in two ways: positively or negatively. If an individual generally perceives events positively, it is known as optimism. If a person generally looks at events in a more negative light, this is known as pessimism. In order to become more successful individuals, it is important to delineate what mindset to have. This study aims to discern how dispositional optimism and pessimism, their attribution, as well as levels of self efficacy and resilience, affect college students' success rates. Considering the theory of dispositional optimism, it is hypothesized that those with a high self-reported optimism will result in higher academic performance and higher self-reported GPAs. The results of this study will be used to understand the importance of dispositional outlooks on university students' academic performance better.

#53 Evan Getz (Bachelor of Arts)

Style of Shoes Correlating with Peoples Hobbies or Activities

This research explores the relationship between individuals' choice of footwear and their hobbies or activities. The objective is to investigate whether there is a correlation between the type of shoes people wear and their engagement in hobbies or activities. We will collect data from participants, and the findings may have implications for consumer behavior, fashion trends, and marketing strategies. Selecting footwear is an aspect of style and self-expression, with shoes serving both functional and fashion purposes in various styles such as athletic sneakers or casual. The study addresses the question; Is there a connection between shoe styles and people's hobbies or activities? Analyzing a sample of 100 students may reveal correlations between certain types of shoes and specific hobbies or activities. The research is important to note that this does not prove a cause-and-effect relationship; it suggests that people might choose their shoes based on their lifestyle and interests. Understanding this has the potential to enhance marketing strategies, develop products, and increase customer satisfaction within fashion and footwear. This study adds to our understanding of how style, lifestyle, and self-identity interact. It was predicated that there would be a statistically significant correlation between shoes and hobbies, lifestyle, and self-identity. Footwear, as an integral component of personal style, is postulated to reflect individuals' engagement in specific hobbies or activities, thereby influencing perceptions of self and others. A theory focused on this topic is self-expression and identity theory. It is hypothesized that there will be a statistically significant relationship between footwear and hobbies and their importance one places on their own footwear and the level of importance one places on others' footwear. Results will be used to give beneficial information on what others perceive based on what an individual is doing for a hobby.

#9 Marcelina Halas (Political Science and French)

An Assessment of the Motivations of Foreign Language Learners at CCSU

The current status of English as a global lingua franca makes the decision of many native English speakers to study a foreign language in general, and in college especially, seem superfluous. Moreover, such a decision runs counter to cultural norms, as studies indicate that Americans, in comparison to

their European counterparts, have little to no interest in learning foreign languages. This apathy toward foreign language acquisition can at least in part be explained by the idea of American Exceptionalism, which states that by virtue of its association with the United States, English is in some way superior or dominant to other world languages. One lasting consequence of this limited perspective is a diminished focus on foreign language education in American K-12 schooling and beyond. In this thesis, I assessed the motivations of five American college students at Central Connecticut State University in choosing to study a foreign language by way of semi-structured, face-to-face in-depth interviews. Specifically, I measured the role played by intrinsic v. extrinsic motivations in their decision to study a foreign language in college. The most commonly reported intrinsic motivations were: a) to connect with one's heritage, b) for pleasure, c) to prove they could do it, d) to better understand the culture, and e) to be able to converse with others. Meanwhile, extrinsic motivations included: a) to make others proud, b) to read religious text, c) for its career utility, d) to go abroad, e) to accommodate others, and f) to increase marketability. These results not only disclose the reasons why American college students are choosing to study languages other than English, but also how their choice reflects their attitudes toward English itself.

Keywords: English, lingua franca, foreign language, intrinsic motivations, extrinsic motivations, American Exceptionalism

#2 Jaqueline Jimenez (Sociology and Criminology)

Examining the Impact of Gentrification on Communities of Color: Through Policy making, Economic disparities, Displacement, and Historical Transformations.

It has become evident that gentrification carries systemic injustices and impacts people of color, gentrification deepens racial divides within communities. When neighborhoods undergo these types of changes, marginalized communities often have to bear the after effects. Such as, displacement and economic instability. Gentrification tends to prioritize the interests of wealthier, more predominantly white individuals which causes many disparities such as having access to housing, education, or economic opportunities.

Gentrification has many effects, one of those is causing people to not be able to move forward in their lives or even have the opportunity to start generational roots anywhere. Gentrification also affects the history of these communities through the redevelopment of new buildings and the rising property values. Through this process many historical buildings get demolished in order to make room for more upscale buildings that are tailored for incoming residents. As the cost of living rises, many residents have a hard time affording to live there which forces them to relocate. When these residents move they carry their unique traditions that have been in the community for years. Gentrification holds significant sociological importance because it raises questions about power dynamics, racial inequality, and cultural transformation.

#27 Zhané Kelly (Psychological Sciences)

The Role of Stereotype Threat in Classroom Participation Among African American Women

The purpose of this study was to examine if reminders of the Angry Black Woman (ABW) stereotype affect classroom participation among African American women. This research also sought to examine if endorsement of the ABW stereotype is related to one's willingness to participate in the classroom. Previous research has been dedicated to the ABW stereotype in the workplace or media (Kilgore, 2020; Motro et al., 2022). Research showed that to avoid being labeled as the angry black woman, black women find themselves suppressing their anger in different environments of their life such as in the workplace (Kilgore, 2020). Yet very few address the effects of the stereotype in a classroom setting. This study aimed to fill this gap by examining 40 Black female undergraduate students ($M = 21.10$ years old, $SD = 1.84$) which were first consented to participate in the study. Subsequently, they were randomly assigned to a high or low ABW stereotype threat condition. The conditions involved a Reddit post where a

Black female student shared her experience discussing with classmates. In the high stereotype condition, she faced criticism for her differing opinion, while in the low stereotype threat group, there was no negative response. Lastly, participants completed measures of classroom participation, racial identity, and the ABW stereotype. Participants were debriefed and compensated with gift cards. Findings revealed there were no significant differences between the high versus low ABW stereotype threat group and classroom participation. However, results found that there was a negative correlation between endorsement of the ABW stereotype and classroom participation. Results suggested that endorsement of the ABW stereotype could negatively affect how Black female students view their classroom experience. Furthermore, among Black women, reminders of the ABW stereotype could result in feelings of neglect which could impact classroom-related needs that lead to success.

#68 Samruddhi Marathe (Psychological Science)

Do study titles alter treatment effects?

Survey Methodology has shown that when sending out a survey, the survey's title alters the response rate and the type of people who take the survey. (DeBell 2022) This project examines how online study titles on online platforms can alter treatment effects. We replicate online experiments with known treatment heterogeneity using titles to attract participants showing strong, weak, or neutral treatment effects. We aim to show online study titles can alter replicability. Survey titles influence participants and demographics. With the rise of online studies on platforms like mTurk or Prolific (Peer et al., 2022), where study titles are rarely reported, this project investigates the unexplored impact of titles on treatment effects and replicability. Recognizing treatment heterogeneity in experiments, we aim to show how titles can significantly affect participant response and study replicability through treatment heterogeneity (Bryan et al., 2021). For treatment effects moderated by participant characteristics (e.g. sex, political orientation, personality), launching the same study with different titles could draw different participants, altering participation and replicability.

#31 Vanessa Marchant (Psychological Science)

The Effects of Social Media on College Student's Self Esteem, Mental Health, and GPA

Social media provides college students with a way to stay connected to friends and family, while allowing for entertainment and a platform to share content. However, social media has addictive factors that may cause negative self-esteem, poorer mental health, and a decline in academic performance. Social media usage varies from student to student. But what happens when a college student finds themselves using social media more often than they should? The consumption of social media will affect a student's view of themselves, anxiety levels and ability to focus on academics. Using various theories such as the social comparison theory, the self-verification theory, and the social influence theory. It is hypothesized that there will be a strong negative correlation when college students' social media usage increases, then self-esteem, mental health, and academic performance will decrease. These results will be used to spread awareness of the negative effects of social media and the need for limitations on usage.

#3 Rexhensa Mollanji (Sociology)

The Beginning and End of Life. (Quantitative research on the ideal number of children and living with elderly parents.)

This research delves into the intricacies of family structures and perceptions within the field of sociology, with a particular focus on the sociology of the family. Utilizing data from the General Social Survey (GSS) 2021, the study aims to unravel the multifaceted factors influencing decisions concerning family size and living arrangements, especially regarding intergenerational relationships.

The investigation encompasses a wide array of variables, including race, education, income, gender, sexual orientation, religious beliefs, and age, seeking to elucidate the complex interplay of societal norms, cultural values, and individual aspirations. By scrutinizing attitudes towards the ideal number of children and living arrangements with elderly parents, the study endeavors to shed light on the nuanced intersections of these factors in shaping familial preferences and behaviors.

Preliminary findings from the GSS 2021 data have yielded intriguing insights, challenging conventional assumptions and revealing unexpected patterns. While religiosity appears to correlate with a higher ideal number of children, income level does not exhibit a significant relationship with familial preferences. Similarly, disparities based on race, gender, and age emerge, with implications for familial living arrangements and caregiving responsibilities.

The research seeks to deepen understanding by exploring additional dimensions, such as variations within religious faiths and racial groups, to discern patterns that may otherwise remain obscured. By elucidating the desires, challenges, and choices confronting individuals at different life stages, the study contributes to a more comprehensive understanding of family dynamics and societal structures.

Ultimately, this research serves as a crucial bridge between the fundamental pillars of society—children and the elderly—illuminating the complexities of familial relationships and the profound impact of social, cultural, and individual factors on familial decision-making processes. Through this exploration, the study offers valuable insights that inform policy, practice, and societal discourse surrounding family dynamics and intergenerational relationships.

#71 Mayson Murphy (B.S. Music Education K-12)

Classical Music in Modern Society: The Entertainment Industry and Social Media

American classical music is an ever-changing form of entertainment that touches the hearts of those who perform and listen to it while relishing the limitless and timeless feel music provides. This thesis sheds light on the prominence classical music maintains within our society, even as its methods of influence and engagement, particularly through social media platforms are constantly progressing. The evolution of classical music continues to have a lasting impact on American culture on a social, economic, and wellness level through the growth of the entertainment industry including gaming and social media use.

#46 Madison Nelson (Sociology)

The Hypersexualization of Black Girls & The Implications on Black Womanhood

The Present study 'The Hypersexualization of Black Girls & The Implications on Black Womanhood', proposes that the hypersexualization of Black girls may have lasting negative impacts on the quality of their adult life in areas such as education, health (both physical and mental) as well as their careers and financial status. The history of sexualization of Black women and girls provides an overview of how the modern ideation of Black women as sexual deviants came to fruition. The stereotypes and archetypes that follow Black women are discussed with emphasis on the "strong Black woman". A brief section describes the cultural context behind why Black girls are sexualized at a young age and the psychological effects of that sexualization at a young age. Finally, the literature section uses empirical psychological and sociological studies, articles and literature reviews to address the implications on Black women's quality of life. Interviews were conducted with subjects aged 21 and 40 respectively to provide firsthand experiences dealing with education, career and financial security, and healthcare including mental and physical health. Results implicated that maturity in childhood primes Black girls to accept any amount of discrimination and hardship thrown at them in adult life. Participants expressed being plagued with a fixed perception and the expectations that come with it, as well as the eventual discrimination that

comes later in adulthood. The projection of womanly attributes on Black girls is the sexualization and adultification of these girls and justifies the mistreatment and abuse of these children (Gadson & Lewis, 2022).

#36 Matison Piripavel (Psychological Science)

The Effects of Mental Health on Collegiate Athletes' Performance and Life Satisfaction

There has been a growing demand for the National Collegiate Athletic Association (NCAA) to prioritize the mental health of their athletes following the rapid increase in collegiate athlete suicide rates in 2022. Due to the many physical pressures and demands college athletes face daily, their mental health is often compromised, leading many to suffer in silence. Research has shown that collegiate athletes are a subpopulation prone to mental illness, but the steps the NCAA has taken in response to this ongoing problem have been in question. This thesis divulges into both internal and external stressors that contribute to the declining mental health in the college athlete population as well as how this, in turn, impacts their sport performance outcomes and life satisfaction. Considering the contributing factors to mental illness in this community, possible ways in which the NCAA can address this occurrence moving forward will also be looked into in hopes of changing the narrative on college athlete mental illness and improving its practices to cultivate a safer environment.

#42 Pablo Ravizzoli (Psychological Science)

The Effect of Fear-Facing Adventure Activities on Social Isolation and Procrastination

Can facing a fear shift us out of avoidant behaviors? Avoidance of unwanted outcomes is a key survival mechanism. Two avoidance behaviors humans use are social isolation and procrastination. Both, when overly relied upon, can form a pattern that can lead to learned helplessness and rob us of experience, vitality, and growth.

The purpose of this quasi-experimental, one-group, pretest/posttest survey study is to explore the effect of fear-facing activities on procrastination and social isolation.

Based on the theories of learned helplessness and self-efficacy, it is hypothesized that voluntary participation in a fear-facing adventure activity, by presenting irrefutable accomplishment, can provide the explicit contiguity (learning), or reconnection with, self-mobilization out of the negative self-reinforcing mechanism of avoidance behaviors and learned helplessness, and into the positively reinforcing mechanism of self-efficacy. It is also hypothesized that this effect will be greater for military service members than non-members, and greater for former military members than for those currently serving. It is also hypothesized that those with the highest scores in avoidance behaviors before their adventure activity will see the largest positive shift in scores. Data was collected via electronic survey including demographics, General Self-Efficacy Scale (GSE-6), Learned Helplessness Scale (LHS), General Procrastination Scale (GPS-9), and Lubben Social Network Scale (LSNS-6).

Results can be used to inform mental health care providers on the impact of promoting such non-pharmacological activities to address these patterns in their clients, including military and first responder communities and populations exposed to natural disasters or warfare. This may serve the purpose of addressing post-traumatic conditions as soon after the originating experience(s) as possible, thereby ameliorating incidence of PTSD or reducing the symptoms of longer standing symptoms.

#10 Sareena Sattar (Philosophy)

The Case For Philosophy Education in Secondary Schools

Contrary to the common belief that high school students are not ready to engage with philosophical inquiry, I argue that high school students are in fact capable of engaging with philosophical inquiry. I begin by defining the terms “philosophy education” and “philosophical inquiry” so as to mitigate potential misinterpretations. Using these definitions, I demonstrate that young children possess natural philosophical abilities. Next, I highlight what a philosophy education can do for children by providing some of the consequent skills unique to a philosophical education. I then show how we can translate this argument to entail that high school students should receive a philosophy education. Finally, I detail potential approaches to implementing a philosophy education in high schools; I explain both how this could be done and why it should be done. I establish each of these points and argue that high school students, contrary to the assumption that they are not, are in fact capable of successfully engaging with philosophical inquiry and would benefit from a philosophy education. I conclude by positing some future research questions that are beyond the scope of this paper.

#43 Yanira Senechal (Psychology)

The Price of Empathy

The price of empathy is costly. The present study is a replication of Cameron et al., 2019 Study 1. This study serves to validate the Empathy Selection Task (consisting of two virtual decks of cards, one empathy and the other one describe), adapted by the researchers to assess empathy choices. Furthermore, the researchers adapted a post-task questionnaire to assess the cognitive differences between the decks. They hypothesized that participants would evade empathy with an emphasis on, effort, aversion, and inefficacy as the cognitive costs. Using a sample size of $N = 72$ students from Central Connecticut State University, I was able to successfully replicate the main analysis of the study, finding that participants did choose to avoid empathy significantly less than they would by chance (e.g. 41% of the time, $SD = .21$; $t(71) = -3.66$, $p < .01$, 95% CI [0.36, 0.46], $g = 2.02$). Participants rated the empathy deck as more effortful ($t(59) = 4.67$, $p < .01$) and aversive ($t(59) = 3.04$, $p = .004$), than the describe deck. Participants may have found the empathy deck less efficacious than the describe deck but the results were not statistically significant ($t(59) = -1.81$, $p = 0.075$). Pearson’s r correlations resulted in weak correlations between the difference of the decks and the proportion of empathy choices. An additional exploratory analysis was conducted, to test my hypothesis that participants who rated themselves higher on the Socio-Economic Status (SES) scale would result in a lower proportion of empathy choices than the rest of the participants. I ran a regression predicting the proportion of empathy choices with SES as the predictor. The model was not statistically significant ($b(58) = 0.537$, $p = 0.466$) (with 12 observations removed due to missingness), therefore there was not enough evidence to reject the null hypothesis.

#44 Cailee Sheehan (Psychology)

How Residential Status, Socioeconomic Status, and Food Insecurity Influence Dietary Outcome in College Students

Dietary choices play a large role in a person’s health, with negative choices leading to detrimental health effects such as heart disease and stroke (Cdc, 2022). Therefore, it is important to examine what factors influence the dietary choices that people make, which can lead to either healthy or unhealthy diets. College students have historically been known to consume a diet that may be considered unhealthy, as they transition from living at home to living independently for the first time in a brand-new environment. Could this environment play a role in influencing what college students eat? The purpose of this dietary study is to address whether physical environment (commuter or residential) is related to dietary outcome. Based on the theories of social influence and planned behavior, external influence and

perceived capability may be contributing factors in dietary decision-making. Therefore, it was hypothesized that there would be significant mean differences in dietary intake quality between residential and commuter students. A secondary hypothesis proposed that the specified factors of residential status, socioeconomic status, food insecurity, and perceived time availability would influence dietary intake. To test these hypotheses, survey data was collected from 70 undergraduate students attending a medium sized New England University. This survey utilized the Rapid Eating Assessment for Participants measure to assess dietary quality (Segal-Isaacson et al., 2004). Food security was measured with the USDA's Adult Food Security Measure, and perceived time availability was assessed with the Perceived Time Constraints to Healthy Eating Scale (Pelletier & Laska, 2012). Various demographic information, including socioeconomic and residential status, was also collected. Results from this study will be used to give insights about the factors that influence a college student's dietary choices, which may be used to create new policies and schoolwide interventions that would aid students in overcoming barriers to healthy eating.

#48 Heather Theriault (Psychology)

The Impact of Work, Stress, and Lifestyle (alcohol use and exercise) on College Student's Happiness and Well-Being

A problem of college student's happiness and well-being is a major concern due to its implications for academic performance, mental health, and overall quality of life. This issue arises from the interplay of multiple factors, including alcohol consumption, workload, stress, and depression. To address this problem, it is crucial to explore the predictive strength of these variables and their combined impact on college student's happiness and well-being. The purpose of this study is to investigate the predictive strength of alcohol consumption, workload, and stress, on the happiness and well-being of college students. By understanding the influences of these factors, we aim to provide valuable insights for developing targeted interventions and support systems that can enhance the overall quality of life for college students. This study, examines elements of the theoretical frameworks, including the stress-coping model, health behavior theory and psychological well-being theories. These frameworks offer a holistic perspective that allows for the examination of how individual factor impacts the happiness and well-being of college students. The two main hypotheses we have made are, College students who work more hours per week will report higher levels of stress and lower well-being compared to those who work fewer hours. Along with, Students who experience high levels of work-school conflict will exhibit lower well-being, burnouts, and increased substance use. The results of this study is instrumental in informing the development of evidence-based interventions and support systems for college students. By better understanding the predictive strength of alcohol consumption, workload, stress and depression on happiness and well-being, institutions of higher education can tailor their resources and services to improve the mental health of their student population. Moreover, this research will aid in promoting a holistic approach to students and ultimately enhance their overall well-being and academic performances.

#18 Alexandra Tzetzio (Psychological Science)

The Positive Effects of Running and Nutrition on Mental Health

Running and nutrition are two key components contributing to people's mental health that are often evaluated negatively instead of positively. Upon further investigation, little research has examined which intrinsic motivators contribute to the benefits of running, nutrition, and mental health. Three intrinsic motivators were evaluated in this research study: autonomy, competence, and relatedness. Thus, the purpose of this research study was to address how these intrinsic motivators can positively affect running, nutrition, and mental health. Based on the theoretical framework consisting of the intrinsic motivation theory, it was hypothesized that the intrinsic motivator of competence would best contribute to proper running, nutrition, and mental health. It was also hypothesized that there would be a positive

correlation between proper running, nutrition, and mental health impacting the participant's desire to maintain intrinsic motivation. Results showed that females report being overweight significantly more than men. Multiple regression results showed that for participants that run (n = 35), a participant's subjective health quality of life and a runner's sports satisfaction significantly predicted the variable of competence. However, a multiple regression showed that although the participant's subjective health quality of life and a runner's sports satisfaction significantly predicted the variable of competence, a participant's internal and external subjective health measures along with their nutritional choices and nutritional practices were not statistically significant. Thus, these results help to empirically show how competence is a strong predictor of a runner's desire to maintain intrinsic motivation as well as show that proper running, nutrition, and mental health contribute to people's desire to maintain intrinsic motivation.

#54 Ruqaya Wali (Psychology)

Enhancing Memory Recall Through Chunking

Memory is an essential tool that allows students to excel academically. Nonetheless it can become challenging to recall a significant amount of information without the use of a strategy. Chunking is a cognitive tool used to enhance the ability to recall memory by breaking down information to smaller, more manageable units. This study examines whether chunking a set of numbers will have a statistically significant impact on a student's ability to recall memory. To conduct this study, fifty university students were placed in one of four conditions. In the first condition, participants memorized a set of 10-digit numbers presented in a non-chunked format before completing a survey. Subsequently, they were presented with the same numbers in a chunked format. The second condition followed the same protocol as the first; however, the sequence was reversed, with participants first encountering the chunked numbers and then the non-chunked sequence post-survey. The third condition was similar to the first, but with a completely different set of numbers. Finally, in the fourth condition, participants received the same numbers as in the third condition, with the chunked numbers presented initially and the non-chunked sequence presented in the final phase of the experiment. All participants were asked to complete a demographic survey, the twenty-item memory distrust scale, and the five-item revised seriousness of forgetting scale. Based on the theoretical framework of chunking mechanism theory it was hypothesized that participants would be able to recall more numbers that were chunked in a phone number format compared to the numbers that were not chunked. Results will be used to educate students on effective study tools to enhance their memory recall ability."

#55 Areesha Waseem (Psychological Sciences)

The Influence of Biological Sex and Gender on Emotional Expressivity and Life Satisfaction

This study examined the relationship between biological sex and gender with emotional expressivity and life satisfaction. Based on social comparison theory men and women often make self-concepts according to what they think they should be like. It does not matter what they want to do or feel like, to fit the characteristics of someone they want to resemble, they will take on their characteristics (Guimond et al, 2007). Social Role Theory suggests that men and women are supposed to have different role socially and this leads them to not question such roles and just accept them (Sebastián-Tirado et al., 2023). To collect the data for this study The Bem Sex Role Inventory (BSRI) questionnaire which has 0.90 test-retest reliability and above .80 coefficient alpha (Holt & Ellis, 1998), Berkeley Expressivity Questionnaire (BEQ) which has 0.86 test-retest reliability and 0.85 alpha coefficient alpha (Gross & John, 1995), and Temporal Satisfaction with Life Satisfaction (TSWLS) which has 0.81-0.83 test-retest reliability and alpha coefficient between 0.76 – 0.93 (Guitard et al., 2022) were used. Food Habit Questionnaire (FHQ; Siewe, 1999) was included in the survey but was not analyzed as it was included to control demand characteristics. The survey had two versions to control demand characteristics. The sequence of the questionnaires in one of the versions was BSRI, BEQ, FHQ, and TWLS and in the other one it was BSRI,

FHQ, TSWLS, and BEQ. The data was collected using non-probability convenience sampling. The survey was completed by participants on SONA (an on-line research participant and researcher software tool), an online research participant and researcher software tool (Gamblin et al., 2017) and social media.

#11 Sydney Wheelock (Psychology)

Personality and life span

This study examines personality change throughout the lifespan by looking at the big five personality traits: Openness, conscientiousness, extroversion, agreeableness, and neuroticism. Each stage of life can influence the Big Five traits in different ways, and this article looks at personality through a chronological lens. Deindividuation Theory and Self-Evaluation Maintenance Theory will be used to explain how personality changes and why it changes throughout the lifespan. In my hypothesis, I predicted that personality will consistently change throughout the lifespan. Previous studies have shown that personality changes most during life events negative or positive like school, social activities, relationships, and transitions including environmental ones like college (Baranski & Garfiner, 2021). Personality changes tend to decline in adulthood, but there are still factors including physical changes and loneliness, along with natural changes in the big five traits as you age. These research results will be used to improve our understanding of the development of our personalities and help contribute to further research.

#52 Alexandra Zupan (Sociology)

A Qualitative Study About the Intersectionality of ADHD

Attention-Deficit Hyperactivity Disorder (ADHD) is a disorder that impacts many individuals including myself. The purpose of this study is to use an intersectional lens to see how individuals view their own disorder based on their intersectional identities. This research seeks to explore the hypothesis that individuals will have different perceptions about ADHD based on their own identity and their family of origins. Interviews were done with participants who had an official diagnosis of ADHD to share their lived experience with ADHD. Some major findings was that family of origin has a significant influence on how individuals perceive and cope with ADHD. This research started with me wanting to investigate how people from different walks of life live with ADHD. This research is important because ADHD is a disorder that has a significant impact on individuals and people have different barriers that they experience as a result of their identities. A trend that I have seen across participants is that there is a lot of stigma when it comes to ADHD medication, and this could suggest that family has a significant influence on either getting diagnosed or how they view treatment. Some limitations of this research is that there needs to be more participants of different races and ethnicities. Having diverse backgrounds could paint a bigger picture of the effect of how others view ADHD.

School of Education & Professional Studies (SEPS)

#61 Courtney Chamberland (Nursing)

Exploring Moral Injury Among Nurses During the COVID-19 Pandemic and Future Planning

Prior to the COVID-19 pandemic, the nursing profession faced persistent challenges such as high nurse-patient ratios and understaffing across hospital and clinic settings. The pandemic has only worsened these difficulties, leading to heightened work-related stress for nurses. Researchers predicted that the COVID-19 pandemic would escalate burnout levels among nurses. However, emerging research suggests that moral injury may be the predominant issue. A cross-sectional study by Mantri et al. (2021) revealed a notable increase in functional impairment due to moral injury, rising from 26.7% in April 2020 to 45.7% in October 2020 amidst the pandemic. Left unaddressed, moral injury can diminish nurses'

confidence, foster pessimism about their profession, and contribute to medical errors. Furthermore, moral injury is interrelated to burnout and can lead to its development. Therefore, comprehending moral injury is crucial for understanding burnout. Despite its substantial impact on nurses' well-being and patient care quality, moral injury often receives less attention compared to burnout in discussions about healthcare professional distress. Hence, it is imperative to explore the correlation between moral injury and burnout, particularly in the context of the pandemic. Furthermore, acknowledging the profound impact of moral injury underscores the urgency of implementing preventive measures.

Keywords: moral injury, nursing, burnout, well-being, COVID-19 pandemic, intervention

#58 Brandon Tang (Bachelor of Science in Nursing (BSN))

The Effects of the COVID-19 Pandemic on Pre-licensure Nursing Education

Unforeseen disruptions to pre-licensure nursing education during the COVID-19 pandemic introduced tremendous uncertainty regarding the proper next steps. Nursing programs responded to this unprecedented occurrence by provisionally suspending in-person didactic and on-site clinical placement to protect students and educators from the coronavirus. Concurrently—faculty and administrators emergently transitioned to an online format, adopting innovative teaching strategies to ensure the continuity of education delivery; yet, this rapid change from traditional pedagogy engendered numerous challenges that may have implications for students' learning outcomes. Other factors related to students' experiences under pandemic conditions (e.g., finances and engagement) may also have influenced outcomes. Although, generally, students and faculty held mixed perceptions over their pandemic experiences with learning and instructing, respectively. Maintaining the pipeline of nurses entering into practice was vital to meeting workforce demands amidst staffing shortages exacerbated by the pandemic; however, it is uncertain if upcoming new graduate nurses are sufficiently prepared. Additional support for students through supplementary education or enhanced care facility guidelines will better prepare students for safe and independent practice. Future research should investigate the sustainability and lasting effects of learning modalities employed during the pandemic, which will assist in improving nursing education and practice.

#1 Carlos Tirado (Nursing)

Nursing Burnout in Relation to the COVID-19 Pandemic

The SARS-CoV-2 (COVID-19) virus is the most recent pandemic which has caused numerous health issues globally. Known for its route of infection by respiratory droplets, COVID-19 spread like wildfire across the world. Prior to its arrival, nurses experienced burnout, a workplace phenomenon caused by unrelieved stress over long periods of time. Characterized by emotional exhaustion (EE), depersonalization (DP), and lack of personal accomplishment (PA), burnout is a troubling condition that affects the mental health of nurses. Amidst the pandemic's arrival, nurses were tasked with providing patient care to those infected with COVID-19. As a result, studies have been conducted highlighting the impact COVID-19 has on the prevalence, physical and psychological factors, and outcomes of nurses experiencing burnout. Factors exacerbating burnout in nurses included fear of infection, long work hours, nursing specialty, length of time spent as a nurse, and COVID-19 policies. Outcomes include depression, anxiety, substance abuse, diminished patient care, leaving professions and suicide. Recommendations to reduce the incidence of burnout in nurses include resilience training, providing mental health resources, increasing job environment safety and benefits, and proper preparedness for future pandemics.

School of Engineering, Science & Technology (SEST)

#12 Macmillan Abu (Biology)

Design and Synthesis of a Synthetic Catalytic Triad

Enzymes are nature's catalysts. They enhance the rate of biological reactions and thus make the existence of life possible. Hydrolytic enzymes are a particularly important class of enzymes in our body. They speed up the breakdown of lipids, starches, and proteins. Scientists have made significant attempts to make synthetic enzymes that mimic this natural system. However, designing synthetic catalysts that match the unparalleled catalytic effect of enzymes continues to be a major challenge. Herein, we propose the design, synthesis, and evaluation of a new class of hydrolase-inspired synthetic molecules built on a peptoid scaffold. Our findings will contribute to a better understanding of enzyme mimicry.

#51 Kiara Azarigian, Olga Veselova, Benjamin Combs, and John Massaro (Computer Science)

Enhancing Human-Robot Interaction: VR Control with Manus Gloves and Unity 3D

Integrating advanced virtual reality technologies with robotic systems opens new opportunities in human-robot interaction. This abstract delves into a pioneering initiative that seamlessly melds the capabilities of Manus VR gloves within the Unity 3D engine for direct communication and control over robots through the Robot Operating System. This venture showcases a technological leap in intuitive and immersive interfaces for robot manipulation.

The project utilizes Unity's robust and versatile scripting environment to create a VR setting where users can interact with robots in real time. The Manus VR gloves stand out for their precise tracking of hand movements and haptic feedback, offering users an intuitive method for manipulating remote robotic arms. These interactions are translated into real-world robot movements managed by ROS, thanks to a specially designed ROS bridge. This bridge plays a crucial role in converting the user's hand gestures, captured by the Manus gloves, into ROS commands and ensuring that virtual interactions have tangible outcomes in the physical movement of robots.

The cornerstone of this research is the establishment of a fluid bi-directional communication stream between the VR interface and ROS. This setup not only verifies the feasibility of using Manus VR gloves for robot control within Unity but also highlights the precision and responsiveness of this system. The successful demonstration of this integration opens up innovative avenues for real-time robot control in immersive VR environments, promising to enhance user engagement and the effectiveness of robotic operations.

This endeavor signifies a significant step forward in the domain of human-robot interfaces. By leveraging the immersive capabilities of VR technologies, specifically through Manus VR gloves, in conjunction with Unity and ROS, this project lays a solid foundation for future explorations in interactive robotics. The implications of such integration are profound, offering potential enhancements in fields requiring precise and intuitive human-robot collaboration.

#29 Brittany Blair (Chemistry)

Characterization of our Water-Soluble Vitamins using ultra-High Performance Liquid Chromatography Coupled with Photodiode Array Detection (uHPLC-PDA) Vitamins are organic molecules that are essential to human metabolism and are consumed via food.

They are either fat-soluble or water-soluble. Vitamins help in growth and development, boost the immune system, and regulate hormones. Characterization of water-soluble vitamins are difficult using a

conventional separation method especially from complex matrices. Reversed phase polar aqueous columns are unique as they allow high aqueous mobile phase for polar compound separation. In this research, we developed and optimized a vitamin separation method and compared a Polar Acclaim Advantage II (PA II) and Hypersil Gold Aqueous columns to separate four water-soluble vitamins – ascorbic acid, thiamine, folic acid, and riboflavin. Furthermore, we used the method to understand the interaction of these vitamins with amine functionalized iron nanoparticles (Fe-NPs). Ascorbic acid and thiamine were prepared in high purity water while folic acid and riboflavin were prepared in 5 mM aqueous NaOH solution. They were mixed to achieve a 50 ppm concentration for each vitamin and pH was adjusted to 7.0. After several rounds of optimization, an initial separation was carried out in a PA II (100 mm × 2.1 mm × 2.2 μm) column using pH 3.0 phosphate buffer and acetonitrile. We observed resolution and reproducibility issues. The vitamin mix was then separated using a Hypersil Aqueous Gold column (100 mm × 2.1 mm × 1.9 μm). We achieved good calibration for all four vitamins ($R^2 \geq 0.99$). We incubated 50 ppm vitamin mix with Fe-NPs using a continuous shaker and observed 100% adsorption of ascorbic acid, 65% adsorption of folic acid, 5% adsorption of riboflavin, and negligible adsorption of thiamine after an hour. Fe-NPs showed both specificity and selectivity towards ascorbic acid and folic acid due to unique amine functionalization.

#19 Cooper Cassells (Human Biology)

Validation of Erythropoietin Receptor – Specific Agonists

More than 5 million patients in the U.S receive erythropoietin (EPO) stimulating agents to rectify anemia annually. EPO promotes erythropoiesis by enhancing the survival and proliferation of erythroid-committed progenitors in the bone marrow. However, EPO leads to thrombocytosis and increased risk of stroke, suggesting it has pleiotropic roles in disparate cell types and highlighting the need for additional research on the cell-type specific effects of EPO. To examine cell type- and receptor-specific effects of EPO on defined populations of hematopoietic progenitor cells, we plan to utilize previously published, exogenously expressed small polypeptides that activate the canonical homodimer EPO receptor (homoEPOR) or the heterodimer of EPO receptor and CD131 (IRR) by binding their transmembrane domains. To validate the function of the receptor-specific polypeptides, we transduced them into a murine lymphoblastic cell line stably expressing human EPOR that is dependent on IL-3 or EPO for survival and proliferation. We cultured transduced cell lines in the absence of IL-3 or EPO to validate that activation of homoEPOR or IRR is sufficient to promote survival and growth. Indeed, cells expressing the receptor-specific agonists persisted in culture in the absence of IL-3 or EPO, whereas the control cell lines died within 5 days of withdrawing IL-3 and EPO. Confirmation of the function of receptor-specific agonists enables us to define the role of EPO signaling in isolated primary human hematopoietic progenitors, which will improve our understanding of the mechanism of action of EPO and aid in the development of targeted therapies for patients suffering from anemia.

#23 Tatiana Fernandez (Biology)

Investigating the Influence of Isolation and Community Living on Crayfish Behavior

The purpose of this experiment is to evaluate the behaviors of crayfish dependent on different factors in their living environments. Two separate living environments were created for the crayfish. One variable included isolated crayfish living in a dark environment and the other variable included crayfish living in a community amongst other crayfish in the dark environment. To evaluate the behavior each crayfish was placed individually in an a plus shaped maze with 2 sides being completely dark and two sides illuminated with light. In testing the effects of a dark living environment, we hypothesize that the crayfish living in a community will exhibit less anxious behavior than those in an isolated living environment prior to entering the maze. To test the behavior, the trait considered to exhibit anxiety is light avoidance. In studying this, analyses are done on the behavior of each crayfish and how they react in the maze by their time spent in the dark vs the light areas and if they retract from either area.

#8 Hailey Hodsen (Earth Science /Environmental Geology)

Geochemical Analysis of Potentially Dangerous Contaminants from Wethersfield Cove in Wethersfield, Connecticut

The Wethersfield Cove is an inlet located in Wethersfield, CT that is connected by a narrow passageway to the Connecticut River, which is considered as the source of water, however there is no obvious outlet raising the possibility of a long water residence time, seasonal changes in the redox condition, resulting in the precipitation and possibly contamination of the cove. The proximity of the Cove to major highway(I-91), and the state capital(Hartford) has made the cove a popular spot for various recreational activities such as boating, and fishing. However, observation of dead fish on the shore of the cove in recent years has raised questions about possible contamination of the aquatic system. This study focuses on examining the concentration and spatial distribution of seventeen major and trace elements in both the water and sediment of the cove. A total of 20 sediment samples were collected at about two feet into the water column from the cove. The samples were air dried, acid digested using aqua regia and analyzed for trace and major elements using an ICP-OES. Subset of the samples were further analyzed for basic soil parameters such as particle size distribution using the hydrometer method, and organic matter contents. In addition, water samples were collected and analyzed for anions (F, Cl, Br, NO₃, SO₄, and PO₄) using a Shimadzu IC-HPLC, and cations using a ICP-OES. During sampling, basic physicochemical parameters of the water column that include pH, temperature, total dissolved solids, electrical conductivity, and dissolved oxygen were determined, and will be monitored for the next three months. Using an overlay of GIS land use map, calculation of multivariate statistical analysis, principal component analysis, cluster analysis, and geoaccumulation index, the geochemical data will be examined to determine degree of trace element enrichment and overall implication on the ecosystem.

#38 Janetta Innis (General Studies)

The Rational Design of a Multivalent Glyco-peptoid Targeted to Wheat Germ Agglutinin

Nature often uses multivalent binding to increase avidity through simultaneous low-affinity ligand/receptor pairings. These multivalent interactions are particularly important in the recognition process between infectious viruses, bacteria, and toxins and their host cells. Some of these include the influenza virus, uropathogenic bacteria, cholera toxin, and Shiga toxin. One strategy to prevent such disease-causing undesirable carbohydrate-lectin adhesion is to develop multivalent blocking agents. Creating a synthetic multivalent ligand that can bridge the binding sites of a lectin requires careful consideration of lectin binding site arrangement and ligand architecture. Herein, we describe the rational design of a multivalent glyco-peptoid targeted to a model lectin system, Wheat Germ Agglutinin.

#69 Aidan Kieft (Mathematics)

The Ethics and Future of Human Genome Modification

The quest for human genetic modification has a rich history, from the pioneering days of recombinant DNA to the revolutionary CRISPR-Cas9 technology. This thesis will explore the trajectory of genetic editing, its promise, and its ethical complexities. By employing a comprehensive review of literature to delve into the historical context, technological advancements, ethical debates, legal frameworks, and public opinions, we can make future predictions surrounding human genetic modification. The historical narrative reveals significant milestones, from the inception of gene therapy to the advent of CRISPR-Cas9. Ethical arguments elucidate the complex landscape of debates surrounding this technology, while legal analyses highlight variations in regulations across different regions. Insights into public opinion, particularly among CCSU students, shed light on diverse perspectives. Future predictions contemplate the advancement and legality of genetic editing, including the possibility of genetically engineered children. The findings underscore the dual nature of genetic editing, showcasing its potential for medical advancement while raising ethical and safety concerns. Current analysis into the technology also reveals

CRISPR-Cas9, despite its efficacy, faces numerous challenges as it exists today. The birth of gene-edited babies in 2018 ignited international debate, emphasizing the need for global guidelines. Efforts to mitigate risks through alternative editing techniques demonstrate promise but require rigorous validation. The ethical imperative demands careful consideration and regulation, as well as an educated populace to ensure this technology, if used, will lead humanity down the best path.

#45 Andrew Krasuski (Software Engineer)

Cybersecurity Learning Platform Aiming To Test The Validity of AI-Generated Content

With the increasing reliance on digital technologies in every aspect of our lives, individuals and organizations are faced with unprecedented risks related to cybersecurity threats. From personal data breaches, to sophisticated cyberattacks targeting critical infrastructure, the consequences of inadequate cybersecurity measures can be severe and far-reaching. Cybersecurity education plays a crucial role in equipping individuals with the knowledge and skills needed to navigate the digital landscape safely and securely. By promoting best practices for data security and privacy, we can better safeguard ourselves against potential risks.

The emergence of artificial intelligence (AI) has further transformed the cybersecurity landscape. AI-powered solutions can analyze vast amounts of data in real-time, providing an extra layer of defense against malicious actors, integrating AI into cybersecurity.

Cyber Tutor is crafted to dynamically tailor content based on each user's unique level of comprehension and skill, as determined by initial assessments and ongoing engagement metrics. Moreover, the platform will boast an admin page offering administrators insights into site usage and enabling seamless CRUD operations. These analytics serve as a cornerstone for the research component of this project, aimed at assessing the efficacy of AI-driven educational content and its impact on advancing knowledge.

While this is currently proof of concept, this project holds promise for future exploration within academic research, offering potential insights into the viability of integrating AI into educational frameworks.

#73 Karena Kulakowski (Biology)

Impacts of Water Availability on Blood-Red Nectar of *Jaltomata quipuscoae*

Jaltomata quipuscoae (Solanaceae) is a recently named species native to Arequipa, Peru that secretes dark red floral nectar. This species is a model for studying floral nectar production due to its abundant nectar and large flower. The goal of our research was to observe how nectar production and nectar chemical make-up of *J. quipuscoae* are impacted by low soil moisture levels. In a greenhouse setting, 15 cuttings, 6 months old, were planted in same-size pots and given either low or high amounts of water. We measured (i) nectar volume and nectar sugar concentration from pairs of flowers, one of each treatment, daily and (ii) individual carbohydrates using nectar from each plant. Results showed that nectar volume and total sugar production in the dry treatment were reduced significantly compared to the wet treatment ($p < 0.0001$, $p = 0.0001$ respectively). However, the overall sugar concentrations of the two treatments were not significantly different ($p = 0.5$). Corolla size was found to be significantly larger in the wet treatment compared to the dry treatment ($p < 0.0001$). Mono and disaccharides from the nectar samples were characterized by an ultra-high performance liquid chromatography coupled with a corona charged aerosol detector using a HILIC-Z column. We observed significant differences in glucose and fructose quantities ($p < 0.05$), however the main effect of water availability was insignificant ($p = 0.16$). We also noticed the presence of an unknown sugar, possibly a disaccharide other than sucrose. Changes in nectar production induced by dry environmental conditions have the potential to impact the pollinators that feed on *J. quipuscoae*.

#41 Jack Moquete (Biomolecular Sciences)

Rational Design of an Anti-Adhesive Agent Against Uropathogenic Escherichia coli (UPEC)

About 150 million people worldwide develop urinary tract infections (UTI) each year. Increasing rates of UPEC resistance to antimicrobials require the development of a new series of antibiotics that are effective against resistant strains. For this purpose, antiadhesive therapy is a potential approach where you block the attachment of the bacteria onto its host cell. This anti-adhesion therapy is neither bacteriostatic nor bacteriolytic and consequently should not exert selection pressure on bacteria and trigger bacterial resistance. As a result, they would be able to combat bacterial resistance to multiple drugs and serve as viable alternatives to standard antibiotic treatment for UTIs. Gram-negative UPEC which causes UTI relies on type 1 fimbriae that project from their outer surface to adhere to the α -D-mannose sugars expressed on bladder epithelium. Herein, we describe the rational design and synthesis of carbohydrate inhibitors that will block the lectin-mannose interactions involved in this adhesion and ultimately prevent infection.

#64 Robert Pezzulo (Biology)

Connecticut Urban Stream Crayfish Sampling

Freshwater crayfishes are highly diverse and can be found on every continent besides Antarctica. North America alone is home to over 400 species across 12 genera, and 9 of these species across 3 genera have been identified in Connecticut waters. Despite being so widespread and diverse, little is known of their most up to date statewide distribution and life history traits. The aim of this research project is to add to our body of knowledge on crayfish distribution within Connecticut. To begin our sampling, we have focused our efforts on an urban stream local to CCSU. Beginning in February, continuous hourly monitoring of stream temperatures was recorded in the field at two locations. Based on the literature, we hypothesized that crayfish activity would begin after the water temperature rose to 10°C, which will provide insight into the thermal ecology of our crayfishes. However, this assumes they are present and not absent due to poor habitat or water quality. Their presence is important because the majority of crayfishes are detritivores, and thus are important to the nutrient cycling processes of stream ecosystems. The more knowledge we have of a local group of species, the more concerted and effective we can make our efforts to conserve them.

#47 Zoe Prevost (Earth Science/Environmental Geology)

ANTHROPOGENIC RELEASE OF MERCURY AND OTHER POTENTIALLY DANGEROUS CONTAMINANTS FROM A COAL POWER PLANT IN BRIDGEPORT, CONNECTICUT

The relative abundance of coal and rapid industrialization led to the establishment of several coal power plants as a dependable power source in the United States. The Bridgeport Harbor Station was a coal-burning power plant that operated exclusively on subbituminous coal from 1968-2021 and was responsible for generating necessary energy for the neighboring towns. Studies have shown that the burning of coal is responsible for the anthropogenic release of aerosols, lead, mercury, sulfur dioxide, nitrogen oxides, particulates, and other trace elements into the atmosphere, which often lead to the enrichment of the neighboring terrestrial and aquatic environment through impaction, sedimentation, rainout, washout, and acid rain precipitation. This study examined the impact of the Bridgeport Harbor Station on the chemical signature and enrichment of mercury and other fifteen chemical elements (Al, As, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, P, Pb, and Zn) in the topsoil surrounding the Bridgeport coal power plant. In order to address this objective, a total of twenty topsoil samples were collected around the plant, and analyzed for acid and soluble extractable elements, basic soil parameters such as particle size distribution, and organic matter contents. Using JMP statistical software, the geochemical data and soil constituent materials were evaluated. Further, the calculation of the soil enrichment Factors (EF)

and Geoaccumulation Indices (GI) provide useful information about the degree of soil enrichments as well as the overall fate and transport of elements within the topsoil of Bridgeport Harbor Station.

#66 Katie Rodriguez (Biology)

Amphiphilic Synthesis Under Prebiotic Conditions

While life was evolving on a prebiotic Earth, amphiphiles were necessary in the formation of membranes to promote cellular life. Amphiphiles are one of the key biological molecules to promote cell organization in biotic matter. However, most proposed amphiphiles are difficult to synthesize or require large concentrations to form membranes. Here we report a new simple synthesis of either single- or double-tailed amphiphiles. We synthesized novel amphiphiles using decanol and amino acids: glutamic acid and aspartic acid through dehydration. The samples were prepared at either pH 3 or 1 and reacted at 60 °C for one week. The products were then analyzed using the LC-MS. Two major amphiphiles were found: decyl and didecyl esters. The relative abundance of each species was pH dependent.

#22 Mark Rodriguez (Computer Science)

Evolution of Machine Learning Models and Evaluation Compared to Humans

As the field of AI has grown and advanced over the years, one of the crucial goals in the field has always been to create models that can perform human tasks that involve the application of knowledge or intelligence. Focusing specifically on machine learning, there have been many recent developments that have revolutionized the utility of these AI models which highlights the importance of evaluating the current state of machine learning models and how these models compare to humans when performing various tasks. To start the analysis, we discuss the progression of the field of AI from its conception to the current day with a focus on the expansion of capabilities for the models throughout the years. Next, we describe current machine learning models including large language models and image recognition models and we investigate studies that compare human performance to the performance of the model for a given task. Using these comparisons, the capabilities of current machine learning models can be explored to evaluate the effectiveness of the models today and what types of drawbacks still exist for these models. In many ways, current machine learning models can match and, in some cases, surpass the abilities of humans in various tasks; however, there are also many examples of tasks that are still better performed by humans. By looking at the differences in how humans and machine learning models tackle these problems, we can glean some insight into how these models can be improved for the future.

#62 Anthony Romano (Mathematics: Actuarial Science)

The Impact of Analytics in Professional Sports

This research paper explains the importance of analytics in professional sports. Its contents detail the drastically positive influence that analytical models have in all areas of the business. The main argument being made is that analytics have only enhanced the focus of profit-maximization in professional sports. Evidence such as team successes and new hires are documented as well as the explanation of specific analytical models and how they are perceived by not only the team's management but by the players as well. The results of this research find that not only do all teams in professional sports have analytic departments but those who invested in analytically driven approaches the earliest have seen recent success such as the Houston Astros; who have reached the American League Championship Series 7 seasons in a row (as of 2023). Research and data show that analytics have had a key role in improving player performance and sustained health. Analytical models are used to aid player contract negotiation and predicting more accurate valuations of not only players but with even less obvious but still important components of the business: marketing and sales methods. With managers, players, and owners all providing positive feedback and using existent data to optimize potential, it is safe to say that analytics is a vital part of the modern professional sports.

#57 Roland Van Duine (Computer Science)

Assessing the Impact of Climate Change and Water Quality on Crustacean Populations in Norwalk Harbor: A Statistical Analysis

Working with data provided by Harbor Watch, we compared the catch total of various crustaceans over time to multiple chemical variables. When factoring in the influence of temperature, salinity, and dissolved oxygen, our results include the usage of regression alongside data transformation to determine if each chemical change influenced population size. To achieve this, the data we were provided had to be cleaned, organized, and have missing values filled to make the analysis as easy as possible. Using these results, we hope to inform Harbor Watch on the potential trends in changing populations and relate these changes to environmental factors.

Honors Program

#13 Isabelle Chevarella (Honors Program/History Secondary Education)

Title IX and the Unfinished Story of Women in Sports

This thesis analyzes the everlasting influence and progress that the women of the 1970s and 1980s had on the evolution of women's sports. Their efforts for equality during a time of enduring challenges shed light on the ongoing struggle to achieve inclusivity within the athletic sphere but also in the current society of sexism and oppression. Women athletes in this era impacted the evolution of sports, through various feminist movements and challenged the perception of Title IX by pushing for its enactment throughout the United States for all girls and women. Achieving this equality required time, perseverance, dedication, and financial investment. Public perceptions about financial investment varied widely from state to state. Funding was determined by how states decided to allocate their resources and funding, some chose to support women's athletic programs and some chose to neglect them. During this era, employment in women's sports was predominantly male-dominated, reflecting the broader gender imbalances of less representation and fewer opportunities in sports for women. Women activists throughout the 1970s played a pivotal role in advocating for implementing and enforcing Title IX through different forms of activism. These relentless efforts pressured policymakers and educational institutions to recognize the importance of gender equality in athletics. The trailblazers of their time utilized the media to forward their platforms to reach wider audiences throughout the United States. Without these courageous women's influence and advocacy, Title IX would not have had the profound and lasting impact on women's athletics today.

#39 Rola Dagamseh (Honors Program/Biomolecular Sciences)

Morality and Ethics in The Handmaid's Tale: Serena Joy as a Sympathetic Character

This thesis discusses the ethics and morality of The Handmaid's Tale, with a specialized critical analysis on the character of Serena Joy. Within the novel, the newly established regime Gilead has rewritten the moral and ethical code of conduct to fit their skewed biblical interpretations to maintain complete tyrannical control in the hands of a few select men, the Commanders. Our narrator, the titular handmaid, details her experiences as a woman within this society. A few key points she has included in her narration are female identity, misogyny and patriarchy, and oppression. Each of these points have ethical and moral implications within the world building and each represents a key aspect in Serena Joy's character. In regards to female identity, Gilead has stripped feminine identity to a woman's only value lying in how they can be used for the consumption of men. The misogynistic nature of Gilead's patriarchy allows men to dominate over and oppress women in all aspects. Women in Gilead are oppressed politically,

institutionally, religiously and emotionally. They are unable to have any active role in government or in the commonplace, as well as unable to have religious freedom or emotional support. Serena Joy has both been impacted and had an impact on each of the points addressed. In this paper, I argue that Serena Joy is a character that deserves readers' sympathies and acknowledgement of her hardships and experiences by the end of the novel based on the ethical and moral analysis of female identity, misogyny and patriarchy, and oppression.

#56 Abigail Denison (Chemistry, B.S.)

Restoring Christian Religion to American Education: The Consequences of Removing Christianity from Modern Education

Dawning the foundation of America, the relationship between education and the Christian religion has shifted and been deemed controversial. Many historians, philosophers, and politicians have investigated the shift of education from colonial to modern America, but few have analyzed the impact of the removal of Christianity from the modern education system. Modern American education strives to exclude religion from the curriculum in the interest of respecting the pluralism within the country. However, colonial education was structured on the sanctity and importance of Christianity within the population, regardless of diversity. To develop an understanding of the significance of removing religion from American schools, three key ideas must be established: (1) the shift of American education based on politics, philosophy, and industrialization from the late 1600s to the late 1900s, (2) the purpose of colonial education as an establishment dedicated to providing access to Christian Scriptures, and (3) the consequences resulting from the removal of Christianity, the very heart and purpose of education, from public schools in America. Since public education was developed to support and provide access to Christianity, American education must be subservient to Christian religion, despite the diverse religious ideals held in the country. Thus, removal of Christianity from the education system results in dire consequences within the public schools, the quality of education, and the future of the nation.

#15 Saad El-Massri (Honor's Program/Finance)

Market vs Intrinsic Value How do people's expectations of markets result in changes in the observable market values?

This presentation goes over inaccuracies within common financial markets as well as defines what market and intrinsic values are. Financial markets in reality are not driven just by formulas and equations, despite the fact that they are important this is not always the case. Human greed, as well as perception of information are just a few of many factors that can result in price changes within any individual market. With the ease of access to information, stocks are becoming more and more pronounced within society and to those who are less experienced in the realm of finance. With this exposure comes new volatility within these markets as a result of the influx of all these newfound investors

#14 Madison Massaro-Cook (Honors Program/Psychology)

The Effect of Mental Health Resources in Education Systems on Adolescent Aggression

This paper is focused on the effect mental health resources provided in education systems have on adolescent aggression. Aggression has been a trait seen predominately in individuals that struggle with emotional regulation. Adolescents particularly encounter this emotional conflict more often due to adolescence being a difficult time to navigate. They tend to struggle with social, physical, and mental issues, and can result in negative outcomes when not provided with the resources needed. With mental health being a growing issue, more resources must be given to meet the needs necessary for each individual. Implementing a quantity of these resources within a school setting is extremely important since it is the place adolescents spend most of their time growing up. However, many education systems

have reported significantly low numbers of mental health resources, meaning students are being undermined of the treatment they deserve. When adolescents feel that there are no other options for help, it causes them to turn to other alternatives like aggression. The amount of aggression seen in different forms has increased overtime, which is why healthy strategies for managing emotions are extremely important to implement from a younger age. If not, unhealthy behaviors are seen to carry out into adulthood. When mental health resources are provided, they give adolescents the tools that they need to change their behaviors at the root, preventing the continuity of these actions from generation to generation. This paper discusses how providing mental health resources has led to an overall decrease in adolescent aggression.

Graduate Level Posters

Carol Ammon College of Liberal Arts & Social Sciences (CLASS)

#28 Amy Collier (Psychology - Health Psychology)

The Effect of Minority Stress on Posttraumatic Stress Disorder: Interpersonal Violence as a Moderator

There is a well-documented relationship between minority stress and posttraumatic stress disorder; it has been repeatedly found that sexual and/or gender minorities report higher rates of posttraumatic stress disorder over their cisgender, heterosexual counterparts. Interpersonal violence is also positively associated with both minority stress and posttraumatic stress disorder, but, to this point, there are no studies positing interpersonal violence as a moderator of the relationship between minority stress and posttraumatic stress disorder. The current study aims to add to the existing literature by exploring the moderating effects of interpersonal violence on minority stress and posttraumatic stress disorder. It is hypothesized that interpersonal violence will strengthen the positive relationship between minority stress and posttraumatic stress disorder. Participants were recruited from the crowdsourcing platform Prolific where they completed an online survey examining minority stress, interpersonal violence, and posttraumatic stress disorder. The net total of 123 participants who were sexual and/or gender minorities aged 18 and above, were included in analysis. While the main hypothesis was not supported, there was a significant relationship between minority stress and posttraumatic stress disorder. Despite the results, a larger sample size and the exclusion of single/divorced participants may result in a different outcome. Therefore, future studies should be conducted.

#40 Mary Lippa (M.A., Psychology)

What Keeps Them Alive? Identifying Moderating Factors between Negative Home Environment and Resilience in LGBTQ+ Youth

LGBTQ+ youth are at an increased risk of family rejection, adverse childhood experiences, and an overall negative home environment, all of which have been identified as risk factors for poor mental health and social outcomes. Quantitative studies have identified frameworks of resilience that LGBTQ+ individuals build in response to this pain and discrimination but have not identified a direct quantitative relationship. This current study seeks to expand on previous research by examining the relationship between resilience and negative home environment quantitatively and identifying potential moderators. It is hypothesized that negative home environment and resilience will have a negative relationship. It is also hypothesized that the home environment-resilience relationship will be moderated by perceived peer support and LGB identity pride. The specific hypothesized mechanism is that increased levels of

perceived peer support and LGB identity pride will reduce the negative effects of home environment on resilience. Lastly, it is hypothesized that LGB identity pride and perceived peer support will have a positive relationship. Sixty-eight participants were recruited from social media and through emails to complete an online, self-report survey to understand levels of LGB identity pride, resilience, and perceptions of family and peer support.

School of Education & Professional Studies (SEPS)

#70 Eric Latronica (Science, Technology, Engineering and Mathematics Education)

The Effects of Curriculum Digitization on Student Learning Outcomes in High School Chemistry

The Coronavirus pandemic has undoubtedly changed how students interact with curriculum. More and more students are interacting with their coursework digitally. As educators, we must ask ourselves, if this shift in curriculum interaction is beneficial to our students. The current literature is nebulous and flip-flops on the efficacy of digital coursework. For this study, two groups of approximately 20 students were assigned a method of curriculum interaction, either digital or analog. Each group's average achievement toward learning outcomes was tracked through the unit and compared to their average achievement from prior semesters. Each group was given functionally the same material and was assessed at the same regular interval, with the only meaningful difference between the two groups being the medium of work completion. This research yielded a statistically significant difference which showed students interacting with coursework digitally underperformed when compared to their previous levels of achievement and the achievement of their similarly abled peers who worked completely analog. Future research should be conducted to see if/ how the purposeful blending of analog and digital curricula affects student achievement.

#21 Michael MacDonald (Athletic Training)

Anterior Cruciate Ligament Reconstruction of a Division I Collegiate Football Athlete

A 23-year-old football safety reported planting and twisting his left knee during a kickoff return in a collegiate football game. At the time of injury active and passive range of motion in flexion and extension was assessed. Both motions were found to be limited and painful. Resistive range of motion in both flexion and extension were found to be strong and painful. A Lachman's test was performed to test the integrity of the anterior cruciate ligament (ACL) and was found to be positive. Valgus stress test was positive for laxity to the medial collateral ligament (MCL). Varus stress test for integrity of the lateral collateral ligament (LCL) was negative. Joint effusion was confirmed by a positive sweep test. Significant pain prohibited the completion of McMurray's test for determining meniscal lesion. Neurological tests were deemed to be within normal limits. The management plan immediately post injury included ice, compression, a hinged brace, and crutches. Diagnostic tests included negative x-rays, while Magnetic Resonance Imaging (MRI) indicated deficiency to the ACL. The athlete underwent four weeks of pre-surgical rehabilitation focused on reducing inflammation and pain. Surgery involved a bone tendon bone autograft ACL reconstruction (ACLR) with a lateral retinacular release. The post-surgical protocol required a non-weight bearing gait for one week, followed by partial weight bearing gait for an additional ten days with the knee in a post-surgical hinge brace locked at zero degrees. ACLR surgery typically involves a six-to-nine-month recovery from the date of the surgery. Currently the athlete is five months post-surgery and is engaged in post-surgical rehabilitation to increase range of motion, restore muscle strength and proprioception. The athlete has recently begun return to running and jumping protocols. The goal is to return to football related activities for the upcoming fall 2024 football season.

#20 Azria Malloy (Athletic Training)

Medial Patellofemoral Ligament Reconstruction on Right and Left Knee Six Weeks Apart on a Division I Football Player

A 19-year-old defensive lineman underwent a medial patellofemoral ligament (MPFL) reconstruction surgery on his left knee and 6 weeks later underwent MPFL reconstructive surgery to the right knee. The right knee was injured during a game when the athlete was making a block and was hit to the lower leg and felt a “pop”. Valgus stress test and patella apprehension test were positive. Two weeks post injury, the athlete sustained an injury to the left knee when an opponent fell directly into the lateral aspect of his leg. The athlete reported feeling his patella shift out of place and self-reduced as the leg was moved into extension. A positive patella apprehension test was noted. The athlete underwent medial patellofemoral ligament reconstruction surgery on his left knee using a semitendinosus allograft and a left knee arthroscopic patellar chondroplasty. Six weeks later he underwent the same surgery on his right knee. The rehabilitation protocol utilized was specific for a medial patella-femoral ligament reconstruction. Short term goals were to decrease swelling, control pain, and prevent quadriceps atrophy. Long term goals were to improve range of motion, ambulation, increase strength, and progress functional activities. The uniqueness of this case is the need to undergo two contralateral knee surgeries within a six-week period. Currently, the athlete has restored full range of motion to the left knee, and continues to increase strength through single leg press, hamstring curls, step up and step down activities. The right knee range of motion has been restored and the athlete has begun double leg mini squats, and four-way straight leg raises. The anticipated timeline for MPFL rehabilitation is approximately four to five months.

#26 Amiyah Peters (Athletic Training)

Musculocutaneous Nerve Dysfunction in a Division 1 Baseball Pitcher

A 23-year-old baseball closing pitcher reported to athletic training with a chief complaint of a “pull” to his right arm after throwing 35-40 pitches during a live practice. The athlete was able to finish pitching effectively although noting “feeling different”. During the evaluation, the athlete reported no pain however had a loss of sensation in the distal 1/3 of the forearm. There was a lack of muscle contraction with the brachialis and bicep along with lack of muscle definition. Testing for active and passive range of motion was full and painless. However, resistive range of motion resulted in weakness and pain free. Special tests included the “hook sign” being positive therefore questioning the presence of the distal bicep tendon. The athlete was referred to Orthopedics, with x-rays being negative and an MRI being scheduled. MRI confirmed the presence of an intact distal bicep tendon, leading to a diagnosis of musculocutaneous nerve dysfunction. Further testing included an electromyography confirming the musculocutaneous nerve dysfunction with a report demonstrating no neurological connection. Musculocutaneous nerve dysfunction is non-surgical and does not require immobilization. Treatment protocol includes strengthening surrounding muscles, nerve re-education and discontinuing throwing for 5 weeks to prevent stretching of the nerve. This injury is unique because cases of musculocutaneous nerve dysfunction is rare in the literature for the throwing athlete. After 7-weeks post-injury, he was able to return to modified pitching. Currently, the athlete is 9 weeks post-injury, and participating as a relief pitcher. However, the medial aspect of the bicep muscle belly lacks size and definition.

#24 Christopher Rose (STEM)

The role of building a sense of self in supporting the development of (intrinsic) motivation.

It is frequently repeated by employers that they require workers with critical thinking skills and intrinsic motivation. Teachers and other education experts underline the relationship between intrinsic motivation and academic success, the body of research highlighting it as perhaps the most important aspect after having a stable home, above even such factors as intelligence and mental ability (Husman;

Lens). However, at the same time, it is the prevailing narrative that internal motivation is not something that can be taught. Countless peers and colleagues echoed that it's, "something you're born with or you're not."

I do not agree with this sentiment. From reviewing the body of research, it showed that there was great interest in capturing a method of disseminating and fostering intrinsic motivation. The prevailing wisdom lingered in the body of research and it showed great resistance to identifying methods of disseminating these skills. Upon reflection, I came to the realization that to develop something from within, such as internal motivation, one needs to be able to better understand and interact with the self. An ability to have a conversation with the self, to hold the self-accountable was needed. In this action research project, I am thus attempting to identify if a strengthened sense of self would also strengthen these related skills and result in an overall improvement in intrinsic motivation.

School of Engineering, Science & Technology (SEST)

#30 Samantha Adams (Masters in STEM Education)

Promoting Productive Struggle to Increase Conceptual Understanding and Academic Achievement in a 10th Grade Advanced Biology Classroom

Traditional methods of teaching science have since shifted to newer, NGSS-based approaches that incorporate inquiry-based lessons and activities. A similar approach, known as productive struggle, is a tool oftentimes used by mathematics teachers to promote student engagement and collaboration. The basis behind this approach is that by allowing students to struggle through an activity, they may understand it on a deeper level than if given straightforward teacher instruction. In order to determine if this approach is effective in a 10th-grade advanced biology classroom located in a suburban school district, 65 students ranging from 15 to 16 years old participated in three activities that promote productive struggle through student-driven learning and investigation, group collaboration, and hands-on modeling. After each activity, students were given a 10 question post-activity review assignment to assess their learning of the basic concepts of the unit. The students also completed a survey that asked them to self reflect on their own struggle and understanding throughout the activity and summarize their experience. Based on the results, students initially struggled to adjust to this new method of teaching, but with more exposure to these activities it was found that their average scores on the assessments increased, self-reported struggle decreased, and overall understanding increased. With each productive struggle lesson, all students actively participated, as opposed to lessons in which notes are provided by the instructor. Throughout the course of the study, students became accustomed to learning in this style and the instructor gained experience designing productive struggle activities.

#72 Kiersten Fortuna (Master of Science in STEM Education)

Impact of Virtual v. Hands-On Labs in the Science Classroom

Labs in the science classroom have been used for decades to allow students the opportunity to "do" science. With technology advancing every day, there has been a shift from hands-on labs to virtual labs. Virtual labs have helped teachers who cannot afford disposable materials to implement real-world applications of science. However, there seems to be a divide for science teachers on whether or not virtual labs are just as helpful for student learning as hands-on labs. Research has shown that both virtual and hands-on labs are effective tools in helping students achieve in the science classroom, as long as they are designed to promote conceptual learning.

In this research study we collected quantitative data taken from a pre-test, lab assessment, and post-test to analyze if there was a difference in student success between a virtual and hands-on lab. Our findings showed that while both the virtual lab and hands-on lab showed an increase in student knowledge from the pre-test to the post-test, the hands-on lab in this research had a greater increase (+1.26 points) in student success from the pre-test score to the post-test score compared to the virtual lab (+1 point).

#6 Nicole Howard (STEM Education)

The Impact of Test Corrections on Mastery of Chemistry Content

Mastery learning has been proven to be an effective way to reach all students of all abilities. This study aims to determine the impact of test corrections as a method of mastery learning in the classroom. 57 students in a suburban high school college prep chemistry class were tested. Two groups of students who did test corrections and students who did not do test corrections were created for each unit test throughout the first semester. The scores on the unit test were compared to the scores on the midterm exam. The difference between the scores of the two groups were then compared. The first unit test showed that the group who did test corrections maintained their average from the unit test to the midterm, however they did not increase their scores. While, the group who did not do test corrections decreased in their average scores by 6%, with a p-value of 0.062. Both the second and third tests did not show any significant difference between the groups. The data did show a significant difference between the average raw scores on the unit tests of the test correction group and the non test correction group. For the test correction group, the average unit test score trended down and a significant difference of -8% was shown between the average score on the atom test vs the bonding test with a p value of 0.01. For the non test correction group, there was no significant difference seen across the averages of the three tests. The average scores of all students who took the tests showed no significant increase or decrease. The data supports the conclusion that test corrections positively impacts the mastery of chemistry concepts. The test correction process does not work for students scoring in the lower range on the unit tests.

#63 Saima Kousar (Health Sciences)

The Effects of Blocking Serotonin Neurotransmission on Crayfish Behavior.

Changes in the functioning of the brain's serotonin (5HT) system are linked to various behavioral disorders, such as anxiety, depression, schizophrenia, bipolar disorders, and aggression. In preclinical and limited clinical studies, serotonin receptors blockers (antagonists) have demonstrated relief of depressive symptoms. Avoidance of light is an indication of anxiety-like behavior (ALB) in crayfish. In prior experiments, 5-day 12-hour treatment with blue light elevated light avoidance behavior in crayfish. We hypothesize if injecting crayfish daily with 5-HT antagonist during blue light treatment will reverse light avoidance behavior. We measured ALB in crayfish by utilizing a plus-maze apparatus featuring both illuminated and non-illuminated arms. Both control and experimental groups were treated with blue light (12-hour dark/light cycle) for 5 days. The experimental and control groups were injected with serotonin antagonist and crayfish saline, respectively. The results will be presented.

#5 Rachel Pipke (Masters STEM Education)

The Effect of Student Choice on Student Engagement in an 8th Grade Science Classroom

Student choice has an overall positive effect on the percentage of class time students spend on-task with an assignment. This study measures student engagement through time on-task and off-task in the classroom. Student data was collected through classroom observations and student surveys and interviews. Student data also suggests that not every student benefits from increased student choice in the classroom to the same degree but may be more impacted based on student motivation or

distractions. This study seeks the answer to the following research question: How does giving 8th graders more choice in their learning affect engagement in a science classroom?

#4 Ryan Sharp (Software Engineering)

An Intuitive Real-Time Robot Teleoperation System Using Virtual Reality and Robot Operating System

The purpose of this research is to create an intuitive virtual reality (VR) system for controlling industrial manufacturing automation robotic arms. Many companies, like our industrial collaborators at GKN Aerospace, use these kinds of manufacturing robots to machine and finish aerospace parts with very small tolerances. These kinds of automated tasks can be difficult and costly to set up, and are prone to many potential sources of error over time. Other companies still use human labor to facilitate this process. However, many skilled laborers in the manufacturing industry are quickly approaching the age of retirement, and there are not always enough new and interested workers to replace them.

This research aims to address all of these concerns at once. By creating an intuitive control system based in VR, users can quickly learn how to control these powerful automation tools. This will significantly lower the difficulty of getting a robotic automation cell up and running, as it will not require users to know anything about robotics or industrial programming. By reducing training time and the amount of required prerequisite knowledge, this will also lower the cost of setting up an automation cell. In future research, we aim to capture real motion and force sensor data of trained craftsmen performing manufacturing tasks so that we may create an AI training model which can analyze the captured data and perform the same task inside the robot cell to the same level of accuracy as the human. This will ensure that even as skilled laborers leave the industry for retirement, their knowledge and skills are not lost and can still be applied in their absence.

#35 Connor Spencer (STEM Masters)

The Effects of Instructional Mode on Information Retention

The research question of this study is, how does modality of teaching affect information retention of electrical concepts among high school students? The study will consist of students from two different classes, Applied Engineering (Course A, n=24) and Principles of Robotics (Course B, n=24), each of which will be taught a unit on electricity. Course A will receive principally hands-on instruction, while Course B will receive traditional instruction, which includes some hands-on instruction but mainly consists of direct instruction. Students in each course range from grade 9 to grade 12.

The Go Baby Go project allows students to participate and view a practical application of the skills that they learn in the class and allows them to practice what they are learning all while giving to families who have children with movement disabilities. This project also allows students to gain experience in dealing with consumers for products that they themselves design and create. The limit of 15-20 Go Baby participants is due to the number of participating families. Each family accounts for a maximum of five high-school students. There are currently three families signed up, and I hope at least one more will also.

Undergraduate Level Oral Presentations

Location: Philbrick Room 120

1:00 pm – 1:15 pm

Alexander Bourque (Chemistry) Engineering, Science & Technology

Analysis of imine products in deuterated chloroform using ^1H NMR

Various imine products were analyzed through proton NMR, using deuterated chloroform as a solvent to measure the purity of each product. A seven-by-seven grid of aldehydes and primary amines was utilized to correlate reactants to their subsequent products. The aldehydes involved in the previous syntheses were benzaldehyde and three structural isomers of nitrobenzaldehyde and anisaldehyde, and the primary amines consisted of aniline and three structural isomers of nitroaniline and anisidine. Initial hypotheses were disproven, as the analyses suggested that steric hindrance was not a major factor in imine product purity.

1:20 – 1:35 pm

Abigail Denison (Chemistry, B.S.) Engineering, Science & Technology

Purification of a Chiral Amine via Preferential Recrystallization

A mixture of 1,2,3,4-tetrahydro-1,11,11-trimethyl-1,4-methanophenazine-8-amine and 1,2,3,4-tetrahydro-1,11,11-trimethyl-1,4-methanophenazine-7-amine (the amine compounds) was synthesized from a mixture of 1,2,3,4-tetrahydro-1,11,11-trimethyl-8-nitro-1,4-methanophenazine and 1,2,3,4-tetrahydro-1,11,11-trimethyl-7-nitro-1,4-methanophenazine (the nitro compounds). The mixture was a set of regioisomers, which required separation. Five suitable solvent systems for recrystallization; including deionized water, ethyl acetate, diethyl ether, hexane, and toluene; were tried in attempts to proceed with preferential recrystallization. Toluene and ethyl acetate were determined to be reasonable solvents for recrystallization. Toluene demonstrated suitable characteristics for preferential recrystallization of the regioisomers, though the process was time consuming, thus not entirely effective. The success of the preferential recrystallization was determined via ^1H -NMR data. Further testing will suggest the success of preferential recrystallization for ethyl acetate.

1:40 – 1:55 pm

Steven Martin (Chemistry & Biochemistry) Engineering, Science & Technology

Phosphotyrosine Recognition by Purified Recombinant SHP-1 C-SH2 Domain

Src homology region 2 (SH2) domain-containing phosphatase-1 (SHP-1), also known as tyrosine-protein phosphatase non-receptor type 6 (PTPN6), is a protein that contains two tandem SH2 domains at its N-terminus. These SH2 domains detect and bind phosphotyrosine (pTyr) residues using two binding pockets, one of which carries a positively charged arginine residue that binds directly to the negatively charged phosphate group. Previous research conducted into p120-RasGAP (Ras GTPase activating protein), a protein also containing two SH2 domains, reported co-crystal structures of SH2 in complex with phosphopeptides. Analysis of these crystal structures identified that the canonical binding mechanism was used by the N-SH2 domain, while variance was noted at the phosphate binding pocket of the C-SH2 domain. In order to better understand how the SH2 domains in SHP-1 recognize their targets, we set out to determine the co-crystal structure of the N-SH2 and C-SH2 domains with previously identified binding partners. Here, we show the expression and purification of recombinant SHP-1 C-SH2 domain from *E. coli*. Preliminary results indicate that the purified C-SH2 protein is able to bind pTyr, as confirmed by native polyacrylamide electrophoresis. Screening for co-crystallization conditions is currently in progress.

2:00 – 2:15 pm

Jake Landry (Biochemistry) Engineering, Science & Technology

Quantification of Amphiphiles in Fatty Acid Membranes: Models for Prebiotic Earth

The ability of amphiphiles to self-assemble from compounds such as fatty acids into biological membranes is a fundamental concept in the origins of life. The structure and quantitation of these membranes still remains very unclear, as sought out in this research paper. Liquid Chromatography (LCMS) was used in this experiment to determine the concentrations of both monocaprin and decanoic acid in a soup. The decanoic acid largely remained in solution in the presence of monocaprin suggesting membrane structure. The presence of vesicles was tested using microscopy to determine membrane function. The confirmation of vesicles in the prebiotic soup and membrane stability suggests the possibility of a model for prebiotic membranes.

2:20 – 2:35 pm

Avery Glagovich (Chemistry) Engineering, Science & Technology

Extraction and Formation of Liposomes from Archaeal Lipids as a Model Protocell

Archaeal lipids are distinct from bacterial lipids in structure and function; the extraction of them provides an opportunity for novel research. Understanding these lipids would be informative for origin of life research as most protocell studies use bacterial phospholipids as a positive control.

Effective methods of extraction and liposome preparation are not well established, and the lipids are not available to purchase. The focus of this research was to elucidate the efficacy of several extraction methods, and the ability of these extracts to form liposomes.

Two archaea were used: thermophilic obligate anaerobe *Ferroglobus placidus* and halophilic mesophilic *Halobacterium salinarium*. Comparison of chloroform/water versus dichloromethane/methanol/buffer as the solvents for the extraction was analyzed using a C18 column for LC-MS with APCI and fragmentation to identify lipid species. Extracted lipids were resuspended in water and examined using fluorescence microscopy for the presence of liposomes.

The masses of some archaeal lipids did not match previous literature reports, suggesting the discovery of novel lipids. Also, some of the *F. placidus* extracts formed liposomes. While this work is preliminary, it lays a foundation for making liposomes of known composition from archaeal extracts for evaluating protocell function as it related to the evolution of life.

2:40 pm – 2:55 pm

Francis Mikalonis (Biochemistry) Engineering, Science & Technology

Generation of Vesicle-forming amphiphile mixtures to produce membranes at the origins of life

Vesicles composed of simple amphiphiles are essential for the origins of life as the first cell membranes, providing protection to the inner workings of cells and containing the metabolism. This research utilized amphiphile solutions determined via machine learning and made with a liquid handling robot, Opentron OT2, to have varying concentrations of amphiphiles and understand better the compositions that form membranes. The amphiphiles used were decanoic acid, decanoate, decylamine, decyl trimethyl ammonium bromide, decyl sodium sulfate, decanol, and monocaprin. The mixtures were dried and then rehydrated for observation. The observation methods were microscopy, turbidity measurements, UV-Vis, and pH. In total, over 196 compositions were examined. Many of the compositions were found to have membranes, and utilizing statistical analysis, compositional fitness was evaluated. Mixtures of these amphiphiles often produce vesicles in abiotic environments, like those found on early Earth 4 billion years ago while also Automating the Processes of making vesicles.

3:00 – 3:15 pm

Loren Tardif (Biology) Engineering, Science & Technology

Gut Content Analysis of Endangered Sturgeon in Connecticut

Two species of Sturgeon fishes can be found in the Connecticut River. Shortnose Sturgeon (*Acipenser brevirostrum*) and Atlantic Sturgeon (*Acipenser oxyrinchus*) populations within Connecticut are both considered endangered. Minimal knowledge exists of their feeding habits, preferred diet, and seasonal intake variation. This project's goal was to determine these Sturgeon's current diets in the lower Connecticut River, thus, determining which habitats and food items are important to protect.

The permitted methods of capture (by CT DEEP; NMFS Permit to Take Endangered Species for Scientific Purposes No. 19641) included an otter trawl and gill nets. To obtain gut contents, the technique employed was gastric lavage, which safely and quickly flushes the stomach contents out for collection and subsequent fish release. To date, 10 specimens (5 of each species) have been sampled, revealing that for the Summer/Fall season their intake is surprisingly low in both quantity and diversity. This has included some parasites. Identification methods so far have included the use of optical microscopy and many visual libraries to identify the Arthropoda. To further identify the gut content species consumed, DNA extraction and PCR was attempted for multiple five loci across five different orders. Further optimization is needed to yield successful data. Efforts continue to gain more fish samples and increase our DNA yield for optimal eDNA testing. If our spring sampling and methods give us results as expected, then we continue to build a consensus that there is a link in the dietary habits of sturgeon to breeding periods, as well as produce a new list of their current diet, per seasons of the year."

Graduate Level Oral Presentations

Location: Sprague Carlton Room

1:00 pm – 1:15 pm

Sarvenaz Keshavarz (Criminal Justice) Carol Ammon College of Liberal Arts & Social Sciences

After-School Activities' Influence on Juvenile Suspension and Expulsion from Schools

The current study aims to examine the relationship between attendance to after-school activities by youths and their risk for suspension and expulsion from school. Prior literature in this realm has made the connection between structured and supervised after-school activity participation in reducing juvenile delinquency, finding specifically that activities with greater structure and appropriate adult supervision show greater efficacy in reducing deviant behaviors in youth populations. Data collected by the U.S. Census Bureau in their Survey of Income and Program Participation (SIPP) was used to measure the participation of youths ages 6 to 18 in after-school sports, lessons, and clubs or organizations. A statistically significant relation in participation in after-school activities and propensity for juvenile deviance leading to suspension and expulsion was found.

1:20 – 1:35 pm

Antonio Pereira (Master's in general Psychology) Carol Ammon College of Liberal Arts & Social Sciences

Don't hit your head on that

In ecological psychology, affordances are one of the fundamental concepts that have appeared in countless research studies. Affordances can be considered the characteristics or traits that facilitate behavior. With this, many researchers use verbal cues to determine whether a specific environmental

feature affords a behavior. Wagman and Malek (2008) had participants provide yes or no responses to whether a barrier could be walked under without ducking. This study aims to replicate the results while obtaining the data in a novel way. Data was collected using IMU to track body movements. Using body movements allows for a more objective way to collect affordance judgments. A repeated measures ANOVA was conducted to test the hypotheses that postural sway would increase when a barrier was lower than the participant and when the barrier was above. A P-value of .105 was reported. While the results of this experiment were not significant, the methodology and direction of this study show promise.

1:40 – 1:55 pm

Genia Thompson (Criminal Justice) Carol Ammon College of Liberal Arts & Social Sciences

Gun Control Laws and Rates

In the United States violent crime rates have been on the rise over the years, including both non-fatal and fatal outcomes (Kleck, Kovandzic, & Bellows, 2016). Gun advocates support firearms because they believe it is a crime deterrent, as they use guns as a form of protection, and it is a constitutional right. However, gun control advocates say otherwise, noting that criminals are committing crimes with guns, creating detriment in the world. However, both groups conclude that firearms have a major impact on an individuals' life (Cook et al., 1997). Violent crimes that involve guns can include murder/ homicide, physical assault, sexual assault, and robbery. Violence is often viewed as a crime factor or a problem that has been difficult to reduce through governmental efforts. However, researchers and officials may have argued that firearm mortality rate can be reduced through regulations of assault weapons, specifically firearms (Kleck & Patterson, 1993).

2:00 pm – 2:15 pm

Jaden Walker (Computer Science) Engineering, Science & Technology

Transformers In Natural Language Processing

This paper summarizes our research on the significant impact of the transformer architecture in natural language processing (NLP). Before the advent of transformers, sequential data processing was predominantly handled by recurrent neural networks (RNNs). However, RNNs were hampered by computational inefficiencies and semantic limitations intrinsic to their design. The introduction of the transformer architecture signified a revolutionary shift in neural network design, integrating parallel processing and attention mechanisms. These advancements allow the model to thoroughly analyze entire sentences and their contextual relationships. In the paper, we explore the intricacies of the transformer architecture, focusing on three essential components: input embedding, positional encoding, and the attention layer. These elements are crucial in enhancing the model's performance. We provide an illustrative example demonstrating how transformers outperform previous models by generating nuanced responses to input sentences.

The paper also examines the significant impact of transformer architecture on the AI industry, notably in the advancement of large language models (LLMs) developed by leading companies like OpenAI, Meta, and Google. We discuss the incorporation of LLMs into diverse applications, including search engines, and their role in the widespread adoption of AI-powered tools, highlighting the effectiveness of transformer-based architectures. We conclude by emphasizing the extensive reach of transformer architecture, extending beyond AI to influence various aspects of automation and revolutionize workflows, demonstrating its broad and multifaceted impact.

2:20 – 2:35 pm

Brenna Yeager (Criminal Justice) Carol Ammon College of Liberal Arts & Social Sciences

The Relationship Between State-Mandated Diversity Training and Racial or Ethnic Variations in Aggregate Rates of Lethal Use of Force

This research examined whether legislatively mandated diversity training for law enforcement officers was associated with racial variations in lethal use of force. Using publicly available data from all 50 states, this study considers the impact of training mandates on almost 3,500 instances of lethal force between 2021 and 2023. Variations in aggregate rates, percentages, and disparities were considered. Study outcomes substantiated that there is a significant overrepresentation of racial minorities killed as a result of police officer use of lethal force. However, state-mandated trainings intended to address such variations were not significantly related to aggregate patterns of lethal force.