A *HYBRID* EVENT!

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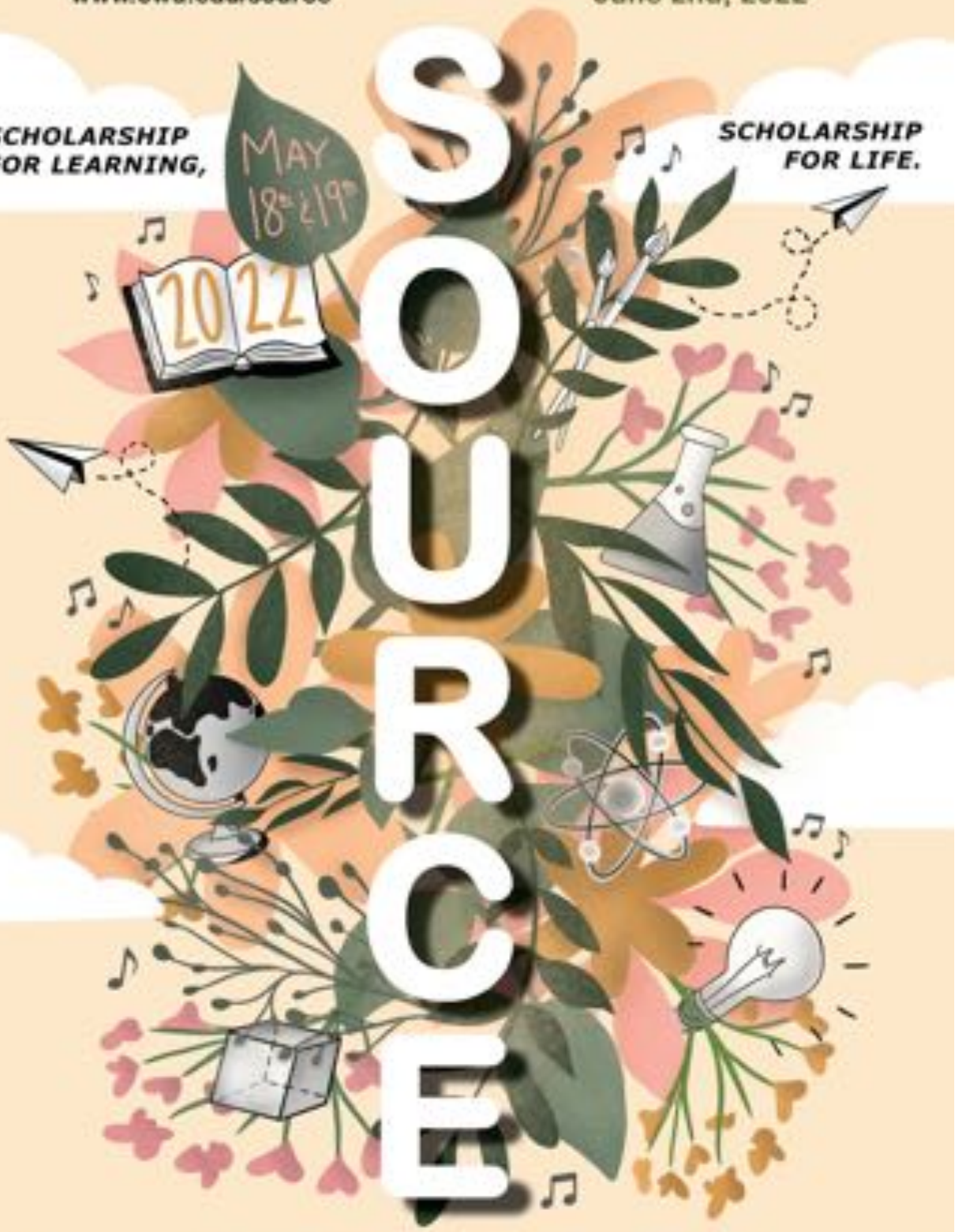
AWARDS CEREMONY,
June 2nd, 2022



SYMPOSIUM OF UNIVERSITY RESEARCH AND CREATIVE EXPRESSION

Central Washington University Presents

SOURCE 2022

The Symposium of University Research and Creative Expression

Program and Proceedings

27th Annual Conference
A hybrid event May 16th-20th, 2022

Printed May 15, 2022

SOURCE 2022 Schedule

Virtual Poster Viewing, https://source2022.sched.com/

Monday May 16 – Friday May 20th

Student Presentations

Wednesday, May 18th SURC Ballrooms and SURC Theater
Thursday, May 19th SURC Ballrooms and SURC Theater
(will also be streamed via Zoom)

SOURCE Award Ceremony

Thursday, June 2nd SURC Ballrooms
(will also be streamed via Zoom)

SOURCE 2022 Planning Committee

SOURCE happens because of the efforts of the faculty, staff, and students that serve on the planning committee.

- Kurt Ikemeier, *Regional Director, CWU-Des Moines Center*
- Volha Isakava, *Assistant Professor, World Languages & Cultures*
- Carla Jellum, *Assistant Professor, Recreation, Tourism and Events*
- Mishel Kuch, *Associate Director of Student Life*
- Monica Medrano, *Regional Director Wenatchee/Moses Lake*
- Gabrielle McNeillie, *Assistant Professor, Physical Education, School Health & Movement Studies*
- Erin Craig Ricketson, *Associate Professor, Physics*
- Allyson Rogan-Klyve, *Assistant Professor, Science Education and Douglas Honors College*
- Erin Sulla*, Assistant Professor, First Year and Transfer Experience Librarian Instruction and Research Services*
- Steve Wenger, *Director, Wildcat Shop*
- Brandy Wiegers, *Director, Office of Undergraduate Research/Associate Professor, Mathematics.*

Our thanks to the 2022 SOURCE Committee for their support of the SOURCE event.

Thank you also to Katie Jo Stewart who designed the 2022 SOURCE poster in Art 371 in Spring 2021 and updated the poster as the program changed in 2022.

Our Thanks to the 2022 Sponsors

Central Student & Activities Fee Fund
CWU Foundation
CWU Libraries
Office of the President
Office of the Provost
School of Graduate Studies & Research
Student Success
The Wildcat Shop
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CWU Catering

Thanks also to the many groups who supported Central students in doing SOURCE work this year

AKS Korean Studies Scholarship
C. Farrell Fine Arts & Research Scholarship
Central Faculty-Student Provost Research Grants
Central Graduate Student Research/Creative Activity
Central OUR Grants
Ellensburg High School
Ivory Nelson Graduate Fellowship
McNair Program
Shirley Joan Cook Undergraduate Research Award
United States Department of Defense
WASER Grant
Washington State Distinguished Fellowship in Biology
William O. Douglas Honors College (DHC)

If you are able contribute to the research, scholarship, or creative experiences of students at CWU please donate or contact us, source@cwu.edu

Selecting SOURCE as your greatest passion will put your gift directly towards the Symposium of University Research and Creative Expression, the annual event in May where students from across the university and community members present their work.

Selecting Undergraduate Research as your greatest passion will put your gift towards our travel and research grants for undergraduate students and will allow us to expand our efforts in other areas.

http://www.cwu.edu/undergrad-research/support_us

Thank you for your support!

Table of Contents

College of Arts and Humanities

Departments of the College of Arts and Humanities (CAH) at Central include:

- Art + Design
- Communication
- English
- History
- Music
- Philosophy and Religious Studies
- Theater Arts
- World Languages and Cultures

In addition, the College of Arts and Humanities (CAH) at Central includes the following programs:

- Africana and Black Studies
- Asian Studies
- Film
- Latino and Latina American Studies
- Liberal Studies

To learn more about College of Arts and Humanities visit https://www.cwu.edu/arts/

Art + Design 2022 Juried Undergraduate Student Exhibit

Location: Sarah Spurgeon Gallery
Exhibit on View: May 5- May 20, 10:00 am – 3:00 pm

The 2022 Juried Undergraduate Student Art + Design Exhibition is made possible through the generosity of Ted Wiprud ('62) and his wife, Louise. Student awards have been donated by the following individuals and organizations: the Student Union Advisory Board, Ted and Louise Wiprud, Jane Orleman, Professor Emeritus Glen L. Bach, Associate Professor Maya Chachava, Associate Professor Marcus DeSieno, GalleryOne Visual Arts Center, PUNCH Projects, Shane L. Johnson Illustration, Associate Professor Rachel H. Kirk, the Department of Art + Design, and the Sarah Spurgeon Gallery.

Africana and Black Studies; English; Film and Video Studies; Women's, Gender and Sexuality Studies

The Monsters Within: An Analysis of Minorities in the Horror Film

Presented by: Julianna Kropla, Project Mentor(s): M. O'Brien

Abstract: Horror films are watched by many regardless of gender, race, or sexual orientation. However, the horror film has been traditionally built off negative stereotypes of minorities. There has been a lack of positive representation for women, LGBTQ+ individuals, and Black individuals. The purpose of my research is to find the gap between horror media consumed by society and its exploration of topics such as racism, sexism, and homophobia. I aim to discuss the relevance and importance of representation. My research question asks: how have horror films portrayed minority groups and their identities during the 1970-present and how have these portrayals evolved? To answer this, I chose eleven horror films of varying sub-genres to analyze. I read literature that formed an academic foundation to build my thesis upon. My approach of using a wide array of films as well as using queer, critical race, feminist, and film theory provides a diverse perspective. Minoritized peoples and their representation in horror now produce counter-narratives that diverge from mainstream horror depictions such as the all-white, heterosexual, male-dominated casts. The horror genre has engaged in social commentary, but now it is clear that these films encourage the audience to think about trauma, society, and how we can change. My research importantly addresses instances of progress in horror media and makes social injustices and prejudices explicit so one can fight against them. As I continue in higher education, I aim to further this research and encourage those who make media to be inclusive

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: McNair Program.

Africana and Black Studies;Library & Information Science

Joanna Cargill and Amanda Waller: A Critical Black Feminist Analysis

Presented by: Tanisha Roman, Project Mentor(s): Rebecca Lubas, Dr. Natashia Lindsey

Abstract: This project analyzes two Black female comic book characters, Amanda Waller and Joanna Cargill, from Marvel and DC Comics from 1986-2021. With the growing success of comic books, this project aims to answer these questions: can Black female characters be used in library initiatives or library programming to attract new readers? Or are the renderings of Black female characters filled with too many stereotypes and racist tropes to be used positively in library initiatives or library programming? Utilizing a Black feminist lens, I analyze articles and podcasts from the creators of Amanda Waller and Joanna Cargill in conjunction with an analysis of the visual and narrative representation of these two characters in Marvel and DC's canon. Numerous studies have shown that many Black female comic book characters are filled with stereotypes and racist tropes. Additionally, several studies have shown that using comic books to inspire new readers increases reader motivation. However, no study has been done at the nexus of using Black female comic book characters to attract new readers and using complex and diverse Black female comic book renderings in library programming.

After analyzing both Amanda Waller and Joanna Cargill's canon, I determined that a majority of the visual and narrative representations were full of racist tropes and stereotypes. Therefore, I suggest that these characters cannot be used to attract new readers and instead suggest more research on how to develop library programming based on Black female characters in a way that doesn't uphold racist stereotypes and tropes.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: McNair Program.

Asian Studies

Conscription in South Korea

Presented by: Jennifer Rhee, Project Mentor(s): Yoon Kim, Chong Eun Ahn
Abstract: South Korea has had a mandatory military service requirement for male South Korean citizens from the ages 18-28 since the 1950's- the government's response to accelerate the establishment of a stronger defense force during post cold-war times. The disposition of conscription has been changed multiple times since it's implementation and continues to be reexamined as South Korea progresses, but it still faces scrutiny and controversies as forced labor conventions are challenged and many young men will try to find exemptions from the obligation to serve their country for several years. This presentation will observe the history, reasoning, and future of conscription in South Korea.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: AKS Korean Studies Scholarship

Education Systems in East Asia

Presented by: Nicholas Mahoney, Project Mentor(s): Chong Eun Ahn
Abstract: In education discourse, east Asian education systems are often portrayed as sleek, modern, and competitive. Organizations such as the Organization for Economic Co-operation and Development (OECD) often tout the test scores that countries such as Korea, Japan, and China produce. The scores of these countries are often the highest in the world. However, those scores provide minimal information as to the true impacts of education policy in their respective countries. Using a comparative lens, this study examines the education systems in Japan, Korea, and China to determine the effects of education policy on economic inequality. It examines how the urban-rural divide, education fever, and high-stakes examinations affect the generation of wealth among families in these respective countries.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: AKS Korean Studies Scholarship

Lookism and Education

Presented by: Jessica Benitez, Project Mentor(s): Chong Eun Ahn
Abstract: This presentation is research inspired by the Korean drama “My ID is Gangnam Beauty”. The focus of the drama is mainly on lookism and how it impacts each character individually as well as a collective. Although this is in a college setting the importance of education is not shown which was the inspiration for this research. Education is known to be very competitive but, in the drama, lookism overshadowed this aspect. This social research is meant to compare the impact of lookism and education fever with a focus on how they both impact the search for jobs in modern society.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: AKS Korean Studies Scholarship

One More Foot Out of the ClosetOne More Foot Out of the Closet

Presented by: Abigail (Coy) Ryan, Project Mentor(s): Chong Eun Ahn

Abstract: This presentation looks at LGBTQ representation in Korean pop music and how it influences the LGBTQ movement in South Korea. As one of the most well-funded Korean industries, and globally one most popular performance mediums today, its power and influence should not go underestimated. The behaviors of fandoms and the impact they have as a collective is well recognized. Fans are often at the beck and call of their idols, wanting to exemplify their admiration through verbal or physical means. Fandoms have been observed making mass donations to charity organizations and advocating the same political opinions that their idols show support for. To many fans, idols are more than just artists; they are role models from which they can form the basis of their identity and worldviews from. When LGBTQ issues are becoming increasingly relevant worldwide, many fans are eager to see what their idols may have to say on the subject. At times, they deliver, sparking much response and discussion amongst their fans. Analyzing social media posts and comments around the themes of Kpop, Kpop idols, and LGBTQ rights, I will demonstrate how these online interactions reflect, if not drive the growing trend of support for the LGBTQ movement in South Korea.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: AKS Korean Studies Scholarship

Suicide and South Korean Youth: How a World Class Education System affects its Adolescents

Presented by: Grace Hendricks, Project Mentor(s): Chong Eun Ahn

Abstract: This presentation takes a look at the suicide rates among South Korean youth ages 15 to 19, comparing the numbers to those of the same age range in the United States. We will look at the raw numbers, go over similarities and differences, and end with contributing factors for both groups. Particular focus will be on how South Korea is considered to have the best education system in the world and the impact that fact has on the young people going through it.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: AKS Korean Studies Scholarship

The Nine Cloud Dream: A Deep Analysis

Presented by: Ajah Cruz-Morales, Project Mentor(s): Chong Eun Ahn, Jeffrey Dippmann

Abstract: For my presentation, I will be analyzing what is considered the greatest classic novel out of Korea, The Nine Cloud Dream by Kim Man-Jung (1637-1692). Following the journey of a monk, he will come across 8 fairy maidens, each representing some sort of temptation, he then undergoes an unusual punishment of reincarnation into the most ideal man. This is a punishment for his doubting Buddha's teachings. I will uncover the meaning behind each fairy maiden's purpose in this monk's journey and relate these experiences to his final enlightenment to comprehending the fundamental teachings of Buddha while also tying in a bit of Confucius' teachings, which is a large part of Kim Man-Jung's expertise, more specifically neo-Confucianism, as this is the form of Confucian teachings followed in Korea. Another aspect to the book I will cover would be political, considering this book is during the Joseon Dynasty under the reign of King Suk Jong. Getting an understanding of the politics at this time, as well as the religious factors previously mentioned, will show Korea in one of its earlier days, allowing me to make comparisons between past and present Korea (South).

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: AKS Korean Studies Scholarship

Asian Studies;History;Philosophy & Religious Studies

King Sejong's Legacy

Presented by: Elisabeth Jenkins, Project Mentor(s): Marilyn Levine

Abstract: King Sejong (1397-1450) is known as one of the greatest rulers of Korea of all time, as he created Hangul (Korean alphabet), encouraged significant scientific advancements, reinforced Confucianism in Korea, and caused many political and social advancements. However, despite how important he is in Korean culture, he is rarely mentioned in American classes about Asia. This knowledge is more important now than ever, with South Korea being a major power in economics, technology, and more. To rectify the lack of knowledge of King Sejong, this presentation will cover his achievements and their influence on Korea today, the most obvious of which being Hangul, which is the current Korean writing system. The presentation will also cover how his Confucian beliefs influenced his achievements, as King Sejong's reign was a major turning point for Korea in terms of Confucian impact. A major reason why there is so much information about King Sejong, even though he lived in the early 1400s relates to another of his accomplishments – he took the printing advancements that had been made during his father's reign and embraced them, causing Korea to become the lead East Asian nation in printing, improving printing speeds by 20 times before the design was finalized, providing a better way of publishing scientific advancements and inventions. Through these publications and modern publications discussing them, we can get a picture of King Sejong's life and influence. The broad scope of his influence will illustrate the Korean trajectory of innovation and accomplishment that we see today.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: AKS Korean Studies Scholarship

Communication;Higher Education

Social Influence: Use it for Good, not Evil

Presented by: Angela Kyle, Ashley Smith, Ilham Dakane Project Mentor(s): Robert Perkins, Dr. Donald Wattam

Abstract: Influence is the ability to affect the behavior of others and have the power to move others in a particular direction or decision. This can be in many forms from tactical moves, leveraging, pushing a personal agenda, and more. It can also go in a less taking over the world, evil plan and instead a good direction with your team connecting, involved, and even being inspired. It comes down to how effective leaders within a team are going to interact and how they will use their social influence within the group's dynamics. Social influence is a powerful tool in group settings when used properly. To understand the background of social influence, we must first break it down into pieces and examine each one. The term "social" is linked to groups and communities, and "influence" is linked to power and authority. When the two are put together, we can visualize a group being impacted by a source of authority. When discussing social influence, one must consider the ways in which it can be used well in both groups and organizations, as well as how it can be misused and negatively impact these groups. In our research we examine three theories surrounding social influence, determine the best practices for using social influence in a positive way and offer potential solutions to our concern of misusing social influence for nefarious purposes.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

English Language and Literature

Mestizaje through Epidemic: Curanderismo as Spiritual Healing in Alejandro Morales' The Rag Doll Plagues.

Presented by: Karla Maravilla, Project Mentor(s): Christopher Schedler, Xavier Cavazos
Abstract: As Susan Sontag describes in Illness as Metaphor, there is wide use of "medical imagery" for satirical commentary, where disease acts as metaphor for analyzing corruption within society (42). Through a reading of Alejandro Morales' The Rag Doll Plagues (1992), this paper analyzes Curanderismo, a traditional folk healing system practiced in Latinx cultures, in the novel's representation of epidemics as individual and collective contamination from physical and social illness. Morales' work explores colonization and pollution from the conquest of the Americas into the 21st century. In Morales' text, a colonial physician and his successors attempt to balance their desires with the well-being of society and the state when confronting mysterious plagues in ancient, modern, and future civilizations. The plagues disrupt the temporality of each protagonist's narrative in colonial and borderland cultures, as he struggles to live between the two sites, often visited by the ghosts of his ancestors or descendants, acting as spiritual guides. Morales presents a spiritual illness-to-healing framework that creates an environmental ethos, where the environment and spirit form an intimate relationship essential to remove pollution, discrimination, and socio-political borders. As Maria de Lourdes Medrano argues in "Performances of Mestizaje in 20th/21st Century Literature of the Americas," mestizaje becomes "a discourse of dominance and resistance" functioning as a cultural critique (2). Morales' text suggests that physical and social illness can produce new racial, ethnic, and cultural identities and promote intercultural communication through spiritual healing of the self and environment.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: McNair Program.

English Professional and Creative Writing

A Poetry Craft Talk: Secrets, Symbolism and the Value of Things

Presented by: Jessika Roe, Project Mentor(s): Maya Zeller
Abstract: The intent of this craft talk is to engage the audience in a generative writing prompt for the purpose of developing poetic imagery. By the conclusion of this craft talk each participant will have immersed themselves in the creative process and written a draft poem. The presentation portion of the craft talk explores the intersection between the poetry of Pablo Neruda, specifically his poem "Ode to a chair" and Mary Ruefle's perspectives for writing "On Secrets" from her book Madness, Rack and Honey. The development of this craft talk, and engagement with these poets forced me to consider the relationship between humans and inanimate objects, the true value of material things and how humans can attempt to discover the secrets held within these objects.
This craft talk was originally created for ENG 565 Advanced Poetry Writing. Since leading craft talks is a valuable part of professional development for a writer, I learned how poets responded to the content and prompt within the craft talk, as well as how to create an environment that breaks down barriers and supports creativity.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Casa de Negro House of Black: Spiritual Cleansings in the Time of COVID

Presented by: Karla Maravilla, Project Mentor(s): Xavier Cavazos Christopher Schedler, English
Abstract: From rape in the fields, to racism in the workshop, from discrimination in the sex, to pollution in the lungs, from imperialism in the brain, to the body cut into borders—this performance will cleanse the anxieties developed from the physical and social illness that has peaked these past three years through traditional folk healing presented in the medium of poetry. Through the hybridity of oral and written forms implemented using caesura, couplets, and the rosary, these poems dissect today's traumas and prophesize each cataclysm if left unchecked. From these poems rises an urgency for activism against imperialism and patriarchy, marking the revival of the Chicana spirit.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Noxious Weeds: The Cognitive Dissonance of Fundamentalist Christianity

Presented by: Zachary Schloss, Project Mentor(s): Xavier Cavazos
Abstract: The poem "Noxious Weeds" explores the cognitive dissonance of fundamentalist Christian beliefs and sexuality. The poem's setting is inspired by the chicken coop on my grandpa's farm, which is reimagined through the lens of fundamentalist Christianity. Through the perspective of chickens and their confined space, the coop, the piece explores the tension of living under scripture and continuous "sin." The poem breaks into the biblical epistle form. In this form, the imperative sentence structure dominates, instructing Cream Legbar chickens on how to avoid a life of sin. The "sins" that the work explores denote sexual desires, and they are treated as inevitable. The poem attempts to present the concept of double-mindedness or the double soul, a state of existence in which one tries to follow biblical scripture while also committing sins that contradict them. The state of double-mindedness is viewed in itself as a sin. Yet my piece asserts that double-mindedness, or cognitive dissonance, is an inevitable state of mind when living under fundamentalist Christian beliefs. My poem seeks to explore the cycle of sin and punishment, the fear of God's wrath, and question the tension between one's natural desires and the threat of hell. Devotion through a fundamentalist Christian lens is purgatory, and "Noxious Weeds" attempts to show the hopeless state of the coop so that one might free themselves from it.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Poetic Lineage Map

Presented by: Gianna Starble, Project Mentor(s): Maya Zeller, Miah Jeffra
Abstract: Through a physical construction of a Poetic Lineage Map, I'm interested in exploring the many overlaps of poets, authors, and other artists whose work has deeply impacted the poet I am today. By observing these parallels and confluences of writers, I'm deepening my understanding of poetic evolution and the importance and knowledge that comes from understanding other poets' inspirations and influences. The way I executed it, I see it as kind of a web, all the influences spinning around me. I centered much of my map around my mentor poet, Dorothea Lasky. I've found a lot of interviews with her where she discusses her influences, so I wanted to include them here. Some of the people (like Freud, Turgenev, and Kafka) aren't influences of mine but I see how they indirectly relate to me because of their influence on Lasky. I thought it important to include my other literary influences (like Terry Tempest Williams and Tommy Orange), theatre influences (Sam Shepard, Neil Labute, Tennessee Williams), and musical influences (like Joni Mitchell). For the design, I wanted to do something that represents my aesthetic. I chose to collage on a red poster with images from a book called "The Leisure Alternatives Catalog" from 1979." I focused on pictures incorporating nature, dance, and other arts activities that represent my influences. I used gold glitter glue to make the threads to connect everyone's lineage.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Synesthesia: A Manastash Reading

Presented by: Stephanie Davison, Gianna Starble, Karla Maravilla, Zach Schloss, Caelyn White, Emily Lyon, Project Mentor(s): Miah Jeffra

Abstract: This oral presentation will display selected works from CWU's upcoming issue of the Spring 2022 Manastash Student Literary Journal. We will be exploring the themes of "Wellness and Coping", through readings of prose and poetry presented by the authors in a synesthetic blend of text, image, and sound. The oral readings will be conducted in tandem with a background presentation of video poetry to accompany them. This event will engage the senses through a diverse blend of sensory expressions with the goal of healing campus, community, each other, and ourselves through art.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Transcript, Travelogue: Open Letter to Claudia Rankine

Presented by: Monica Monk, Project Mentor(s): Katharine Whitcomb

Abstract: The presenter will record herself reading her 2,000-word "open letter" in response to Claudia Rankine's and Beth Loffreda's anthology The Racial Imaginary: Writers on Race in the Life of the Mind. In the letter, the writer--a white, female-identifying college English professor—re-imagines her writing classroom twenty years ago as a liminal space where illusions of neutrality and authority in a class of culturally, racially, and ethnically diverse students are disrupted by an unexpected chain of events. A guest speaker lectures on race in America. The scripts of that space—textbook, lesson plan, student and professor voices—un-script and re-script themselves in this open letter from the future. The letter becomes a portal for the writer to return to that space and hour and publicly examine her fear of discussing race in the English classroom. Discussing race and writing opens an intersection between the students' public and private identities, as evidenced by one student who begins to write about race in a new sort of "racial imaginary" that is both within and outside of the classroom space.

The letter was written in Professor Katharine Whitcomb's English 511: Introduction to Graduate Writing in Fall 2021. The Racial Imaginary consists, itself, of a collection of open letters from artists and poets that explore how race enters into art/writing: the creation of a "language of racial identity" and poetry as a site of "dramatization of race" (Spears). After reading the anthology, students were asked to write an open letter to Claudia Rankine.

Spears, John. "An Open Letter from Claudia Rankine." The Rumpus, 12 February 2011, https://therumpus.net/2011/02/12/an-open-letter-from-claudia-rankine/.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

English

Academic Writing and Editing: Analysis and History

Presented by: Kathleen Singleton, Project Mentor(s): Paul Martin

Abstract: One of the primary means of communicating information at the university level is academic papers and other pieces of literature. They are assigned to students, presented at conferences, and relied upon as an important part of university life. When academic writing is so critical to how information is presented, it is important to understand the way that writing is presented, edited, and published to its audience at large, and the impacts its format has on the information it conveys. In particular, academic writing can often be dense and difficult to understand. Some people particularly impacted by this are international students, ESL students, and students who have not encountered academic writing before. Some attempt has been made to try and bridge this gap in understanding by teaching English for Academic Purposes (EAP). This presentation analyzes the history of academic writing across several disciplines and concludes with a summary of a current literature and suggestions for future research.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

English; Humanities

An Interest in Food, Culture, and Food Culture

Presented by: DJ Johnson, Project Mentor(s): Paula Collucci

Abstract: Food is an important part of everyone's life. The types of food that you have access to can tell a grandiose tale of your history or heritage. It is a bit more difficult for that tale to be easily told in a place like the United States, simply because of the incredible melting pot of cultures that exist here. There are so many options for hybridized cuisines and certainly more options for "Americanized" cuisines. If more people focused on the similarities to accept the differences of others, I believe that we would be much closer to abolishing the idea of Us versus Them. We could truly understand that just because the world is a big place, it doesn't mean our neighbors are alien.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Film and Video Studies

Escaping Modesto: George Lucas, Film Auteur, and the Alteration of Movie History

Presented by: Krister Persson, Project Mentor(s): Justin Daering, Asad Farooqui

Abstract: This video essay analyzes the early filmography of George Lucas as a critique of auteur theory. Dissecting THX 1138 (1971), American Graffiti (1973), and Star Wars (1977) based on their autobiographic qualities, this short documentary investigates the advantages and disadvantages of reviewing a complicated cinematic work through the lens of an individual author. Analysis will focus on Lucasfilm founder George Lucas and his reputation for controversially altering his works through special edition re-releases, calling into question the sanctity of theatrical releases and the confines of a film auteur. Does a filmmaker, particularly one whose films are drawn from personal experience, have the right to restrict access to their original works by substituting theatrical releases with director endorsed re-edits? "Escaping Modesto" attempts to answer this.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

French; Music Perfomance

Méhul’s "Le jeune sage et le vieux fou": Adapted English Translation

Presented by: Krister Persson, Project Mentor(s): Justin Daering, Asad Farooqui

Abstract: "Étienne-Nicolas Méhul’s ""Le jeune sage et le vieux fou"" is a one-act comic opera. Debuted in 1793, this work has since fallen out of regularly performed repertoire. This project seeks to provide a performable English translation that respects the original context and comedy of the opera, yet adapts the story to add equal color and depth to the female roles.

At its conception, this project required a transcription of the Revolutionary to Modern French to better captured the original meaning, meter, and comedic intent of the libretto. Further research and consideration of historical context proved crucial to informing any adaptive decisions, providing insight into the ironic comedy and gender writing. After this, the English translation could be refined to modernize the female roles with respect to the nuances of the period. In this, the feminist lens inherent to this project will only enhance the opera’s artistry as it does not undermine the flipped paradigms that create the comedy.

In setting the historically- and equality-conscious translation, this project will account for vocal ease, at times modifying the rhythmic content of the original setting to best fit the new language of the libretto. In this, the finalized operatic translation should increase the work’s accessibility for student singers and function as a period study without sacrificing the dignity of treble voices.

Alongside the development of the full translation and adaptation of ""Le jeune sage et le vieux fou"", this project will include a paper providing detailed context for the translating and text-setting process.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Latino & Latin American Studies; Interdisciplinary Studies- Social Sciences; Sociology; Public Policy; Liberal Studies; Educational Foundations & Curriculum; Communication

Who Belongs in a "Culture of Belonging"? Envisioning CWU as a Decolonized Hispanic Serving Institution (HSI) and Place of Belonging (Querencia)

Presented by: David Song, Project Mentor(s): Christina Torres García

Abstract: Central Washington University is at a moment of opportunity, where Mission, Vision, and Strategic Plan are being rearticulated. Emerging from meaning-making discussions is language around "diversity," "equity," and notably, a "culture of belonging" as values to be centered.

This presentation argues for a mission and vision of CWU becoming the first (and leading) four-year Hispanic Serving Institution (HSI) in Washington. This analysis draws upon Latinx pedagogy and place-based education, envisioning CWU as decolonized HSI and place of querencia. Latinx pedagogy, specifically Gina Ann Garcia's research, offers an empirical and philosophical model for HSIs and demonstrates how supporting Latinx students centers access, equity, and outcomes for all students, especially low-income and first-generation. Querencia offers a rooted embodiment of a "culture of belonging" and place-based education for CWU's increasingly diverse (and Latinx) student population and surrounding communities.

Envisioning CWU as HSI gives practical and cultural meaning to current, aspirational conversations of "belonging" for all CWU students by centering student supports; holistic advising; faculty diversity; decolonizing pedagogy; and serving regional communities.

Under Washington SB 5227, CWU identified DEI priorities like Motion 20-65 and lagging diversity among CWU faculty. These are best accomplished through funding and implementing unfulfilled recommendations found in the 2018 CWU HSI Initiative.

As a decolonized HSI, CWU can become a leading institution in graduating (with minimal debt and other inequitable barriers) a community of engaged, inquisitive, just, and impactful critical thinkers who both represent and make real-world changes in the diverse communities that CWU serves better than any comparable institution.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Music

Fade Away: A Horror Story

Presented by: Marisa Bigsbee, Project Mentor(s): Bret Smith
Abstract: Fade Away: A Horror Story is inspired by old-time radio drama. The project includes brief research on sound design, radio shows, Foley techniques, and how radio shows directly inspired podcasts and audio dramas of today. The presentation will include a brief summary of this research and a presentation of the 15-minute horror story written, casted, directed, edited, and acted in by Marisa Bigsbee.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Concert Performance of Works for Horn Ensemble

Presented by: Beaumont Fry, Alec Chinnery, Laura Cornwell, William Forbes, Julia Mcconnachie, Jaime Ramos, John Roeder, Kellen Schuetze, Connor Schwarz, Lily Sears, Giselle Serna, Emma Tranum, Project Mentor(s): Jeffrey Snedeker
Abstract: This proposal is to present a performance of music for French horn ensemble. The program was proposed and accepted for performance at the 2022 Northwest Horn Symposium, a regional professional conference held this year at the University of Idaho in Moscow, April 8-10, 2022. The works to be performed present a wide range of contemporary styles by composers of diverse backgrounds and experiences, including Fanfare by Ukrainian composer Ekatherina Likhuta, Heptafunk by Portuguese composer Ricardo Matosinhos, Proclamation by American Lori Archer Sutherland, The Myth of Etana by Craig Bakalian, arranged and conducted by CWU student Kellen Schuetze, and music from the movie Robin Hood: Prince of Thieves by Michael Kamen. Our proposed SOURCE performance/presentation will consist of performances of as many of these pieces that will fit in the allotted timeslot, with introductions to each presented by students in the ensemble.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Musical Theatre; Psychology

Reese Sigman is Lying Completely Still

Presented by: Reese Sigman, Project Mentor(s): Kathryn Stahl Jerry Dougherty
Abstract: In the development of "Reese Sigman is Lying Completely Still", I asked myself: What is social performance? What are the effects of social performance on the psyche? Is there a way to stop performing? Through the research of personal image, subcultural membership, and the "true self", my inquiries about social performance were confirmed. We are always performing. During the writing and rehearsal process, I explored performance within social situations such as having a crush, going to a job interview, and talking to yourself. My SOURCE presentation is a filmed collection of songs and scenes examining social performance. My research guided the creation of this new musical, which will be presented May 26-28 in CWU's Milo Smith Tower Theatre.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Philosophy & Religious Studies

A Defense of H.L.A Hart's Will Theory of Rights Against Narrowness Objections

Presented by: Andrew Miller, Project Mentor(s): Matthew Altman

Abstract: Within the study of the philosophy of law, there have been long standing disputes regarding the nature and origin of rights. One prominent view, espoused by authors such as H.L.A Hart, is such that rights are derived from control by the bearer of the right over whatever the object of the right is. Under this view, an individual has a right to an object insofar as they control the object and exert their will over it. Hart's will theory approach to rights has often been criticized on several significant conceptual and performative hurdles, each tied to a notion of problematic narrowness. First among these hurdles is an inability to account for those rights believed to be possessed by individuals generally. Second, Hart's view requires rights to be voluntarily waivable in order to be cogent due to its focus upon control. This is problematic since some rights, particularly rights towards self-ownership or other freedoms, appear to lack any ability to be waived meaningfully. Third, the rights of the incapable are inadequately handled. I defend Hart's work on a will theory approach by showing that these hurdles are not impassable; that Hart's work is defensible against these critiques. My argument includes a reassessment of what is meant by being able to waive a right. This is accomplished by reframing waivability as a refrain from enforcing, rather than as a relinquishment of, rights.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Theatre Arts; Theatre Studies; Psychology

Drama Therapy, Theatre for Young Audiences, and How They Can Help Youth Process Trauma.

Presented by: Kira Cox, Project Mentor(s): Emily Rollie

Abstract: In the past couple decades art therapies have gained more attention and are able to provide an alternative treatment for mental health than traditional therapy practices. Some of these practices include art therapy, music therapy, and drama therapy. Drama therapy is defined by the North American Drama Therapy Association (2022) as "the intentional use of drama and/or theater processes to achieve therapeutic goals." These intentional practices help the person seeking drama therapy achieve mentalization, which is the ability to separate yourself from the emotions of a particular event in order to better understand their emotions (Irwin and Dwyer-Hall, 2021). This ability to separate themselves from their emotions allows youth to practice empathy towards their own situation and helps them better understand and process the trauma associated with a particular event. In addition to drama therapy, Theatre for Young Audiences (TYA) can also help youth practice empathy. Playwrights such as Suzan Zeder, Aurand Harris, and David Saar write TYA plays that explore more serious topics like divorce, death of a family member, and even death of a child. By using TYA, we can open up conversations about difficult topics or explain concepts such as drama therapy and mentalization to youth. This project combine the two concepts together I have written a TYA play, called The Drama Therapist, where the concepts of drama therapy and mentalization are explained through a narrative storyline. This presentation will cover the research that inspired and informed The Drama Therapist while including snippets from the play itself.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

College of Business

Undergraduate Programs of the College of Business (CB) at Central include:

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Accounting

Corporate Values of Tribally Owned Companies in Washington State

Presented by: Halle Hull, Project Mentor(s): Han Donker

Abstract: In this study I examine the corporate values of tribally owned companies in Washington State and compare them with non-native businesses in the same or similar industries. The research objective is to examine the ways in which Washington native businesses integrate native cultural values into their mission and corporate structure. I have developed key words that follow the themes of spiritual/societal, community, and environmental, and I predict that tribally owned companies will include these keywords more frequently than non-tribally owned companies. This integration of cultural values, stated corporate mission, and corporate structure, is an area of potential superior performance compared to alternative models, reflecting the degree to which Washington native businesses are in harmony with, and reflect in their organizational structures and native community values. We will examine how these corporations help native people and preserve their cultural values and beliefs. I also predict that gender diversity is greater in tribally owned companies than in those that are not tribally owned. I predict that the cultural values of Native American tribes in Washington state leads to greater gender diversity within companies owned by Washington state tribes than by non-tribally owned companies.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Economics

A Descriptive Analysis of the Great Resignation and the Great Return

Presented by: William Schuler, Ian Seibel, Project Mentor(s): Tennecia Dacass

Abstract: An event dubbed the "Great Resignation" began in April 2021 in the United States and is described as a phenomenon associated with significant increases in the number of people quitting their job. The quitting rate remained elevated throughout the year, with acceleration recorded in September and November 2021. The industries most affected by the "Great Resignation" include hospitality, retail, business services, and healthcare (primarily nurses). In this paper, we use monthly data from the Current Population Survey for March 2019 to February 2022 to analyze the changes in labor force participation surrounding the COVID-19 pandemic. Specifically, we use descriptive statistics to examine how trends in labor market data for 2021 compare with pre-pandemic levels. We compare these statistics across gender, age (prime-age workers versus workers aged 55 and older), educational attainment, and industry. Increases in the labor force participation rate and declines in the unemployment rate since the beginning of 2022 point to labor market recovery. As a result, we also investigate these recent trends to determine if the groups and industries (e.g., prime-aged workers and the retail and hospitality industries) affected by the great resignation are driving the current increase in labor force participation.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Alternative Transportation Operation Model for Central Transit Operations

Presented by: Betty Mittelstaedt, Kameron Eck, Project Mentor(s): Peter Gray, Toni Sipic

Abstract: We analyzed the viability of electric busses as public transportation in Ellensburg, Washington. We started by collecting data for the current bus transit and associated costs. Due to current inefficiencies in the bus route system, we have decided to create new routes that can be adjusted to people's needs as well as the schedule. Rising fuel costs have encouraged us to look into fully electric busses. We calculated the annual miles driven with the new schedule and route system to compare the fuel costs with electricity costs in Ellensburg. These costs clearly showed an advantage to switch to a fully electric bus, however, to see if it is viable, we have also considered maintenance and vehicle costs. This analysis can be used in any kind of community thinking about switching to electric bussing.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Company Valuation In An Uncertain Economic Environment

Presented by: Nye Tenerelli, Project Mentor(s): Thomas Tenerelli

Abstract: This presentation will analyze a company to determine its worthiness as an investment vehicle. A summary of the business will be provided and the competitors will be identified. The company's market position and growth opportunities will be evaluated. That evaluation will be translated into quantitative assumptions on growth in a two-stage discounted cash flow model of company valuation. The company's value will be estimated and presented using a detailed financial model in Excel.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

CWU Student Price Index

Presented by: Kaylee Cooper, Landen Hashimura, Mia Young, Betty Mittelsteadt, Project Mentor(s): Tennecia Dacass

Abstract: The Central Washington University (CWU) SPI project is a project designed to measure a Student Price Index (SPI), which is a price index of student expenses at Central Washington University. One of the main aims of the SPI project is to take the methodology used to find the costs of living standards on a national scale as done by the Bureau of Labor Statistics (BLS) and to put them in a more applicable lens for the average student at CWU. To do this, we administered a survey to students on the Ellensburg campus with the intent of collecting data on student expenditures and purchasing choices.

Our initial year-over-year findings reveal that the SPI increased by 9.1% percent in February 2022 relative to February 2021. Increases the largest contributors. While the rise in minimum wage in Washington State between 2021 and 2022 was measured at 5.8%, the SPI data indicates a 3.3% pay reduction in real wages when adjusting for inflation.

This represents a larger pay cut than the average American (approximately 2.3%) in the same period. We believe the results from this study and future updates provide useful insights regarding students' cost of living, which is of immense relevance to university administrators as well as current and prospective students. We use simple demand and supply models to qualitatively examine the estimated increase in the price of take-out meals.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Economics; Environmental Studies; Finance & Supply Chain Management

Environmental, Social, and Governance Investing Policies at Universities in the PNW

Presented by: Kameron Eck, Derek Zinn, Magnusson Mussard, Glenn McKee, Davyn Cox, Nye Tenerelli,
Project Mentor(s): Toni Sipic Thomas Tenerelli, Finance

Abstract: To assess the potential impact of ESG investing on the CWU investment portfolio, we analyzed the relationship between company ESG scores and financial metrics of risk and return. Financial data consisted of investment returns and beta scores (a measure of risk), provided by S&P Capital IQ. Institutional Shareholder Services (ISS) provided CIR with ESG scores of 42,977 companies around the globe. Using the S&P 500 and the ISS company database as benchmarks, we compared how CWU's investments paired within the scope of a 1, 3, 5, 10, 20-year ESG-Beta and ESG-Risk relationship. CWU displayed similar results to that of the S&P500 and ISS database – the ESG-Risk and ESG-Beta relationships were nonnegative. The literature review on ESG factors and financial performance suggested that there was a largely nonnegative relationship, like our findings as a council.

Furthermore, we collected information on environmental, social, and governance (ESG) investing policies from a sample of universities in the Pacific Northwest and found that about half of the universities maintain such policies. We identified the full range of different ESG policies across the universities. We then determined which universities were leaders in the field and performed a sentiment analysis of their respective ESG statements. CWU currently does not include investment criteria with regards to sustainability. Improving upon this, we assessed the core values of CWU and other ESG criteria bearing Universities. This provided us with a list of ESG policy tools compatible with CWU's value framework.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: College of Business.

College of Education and Professional Studies

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- Graduate Certificate in Accessibility Studies

To learn more about CEPS visit https://www.cwu.edu/education-professional-studies/

Accessibility Studies

A Practical Guide for Kindergarten Teachers of Nonverbal Students with Autism Spectrum Disorder (ASD).

Presented by: Ellah Nichols, Project Mentor(s): Naomi Jeffery Petersen

Abstract: According to Autism Speaks (n.d.), 1 in 44 children is diagnosed with autism spectrum disorder (ASD); and of that group, 40% are nonverbal. Because this number appears to be increasing at a gradual rate, due to the advancements of modern medicine, schools should place more importance and priority on disability awareness. By doing this, we can help to minimize the bullying, stigma, and prejudice that currently exists. Furthermore, it is especially important that proper interventions are taught as early as kindergarten. Per Mitchel (2019), of Education Week, only 1 in 5 general education teachers feel fully prepared to educate their students with learning disabilities, such as ADHD and dyslexia. What more then, for the students they cannot even verbally communicate with? Lawfully, schools are required to ensure students with disabilities are being treated fairly and are receiving "free, appropriate, public education" (FAPE), but when a teacher is unaware of their students' rights and the resources available to them, it can become a frustrating and ineffective situation. However, through education, advocacy and the proper supports, we can begin to instill confidence and self-efficacy in children who are nonverbal and with ASD, and empathy and understanding in those without disabilities.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Are CWU SURC Information Center Services Adequate for Those with Sensory Disabilities?

Presented by: Meagan Smallbeck, Project Mentor(s): Naomi Jeffery Petersen

Abstract: The Central Washington University (CWU) Student Union (SURC) is at the center of student life on campus and the SURC Information Center is no exception. The Information Center provides various tools to many students and patrons of CWU's campus. Printing services, guest services, laptop checkout, and poster approval are only a few of the services provided by the Information Center Staff. With so much interaction with the CWU community, the point of accessibility is crucial in providing services to every student on campus and not the vast majority. A small portion of the CWU population live life with a sensory disability. Sensory disabilities relate to any of the 5 senses and can also be covered as communication disabilities which includes being d/Deaf, blind, or mute. With a mission to provide services to all CWU populations, the Information Center must be at the forefront of providing the services necessary to these student groups. Through experience as an Information Attendant of 3 years, I will examine the current services provided to determine if they meet the standard of accessibility expected by Central Washington University.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Assessing the Accessibility of the Department of Health's Efforts to Reach Disadvantaged Individuals for Participation in Discussions on Health Equity

Presented by: Autumn Straker, Project Mentor(s): Naomi Jeffery Petersen

Abstract: In February 2022 the Washington State Department of Health hosted 4 virtual Listening Session to collect feedback and stories from disadvantaged individuals who had experienced inequities and/or racism in healthcare. The information gathered directly went toward writing new rules regarding continuing education requirements on health equity for all Healthcare providers in the state. Using WCAG 2.0 International standards and by reviewing the intersectionality between disability, socioeconomics and race, this paper reviews the accessibility of the department's efforts to reach these disadvantaged populations so they could participate in the Listening Sessions or contribute their experience and shape the definitions of state rules.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Essential Sign Language for Hospital Visits

Presented by: Kira South, Project Mentor(s): Naomi Jeffery Petersen

Abstract: This project is towards hospitals and the type of patients that they interact with such as the hard of hearing and deaf population that would come in to get help. In hospitals you never know what will happen or the atmosphere it will have. We also aren't informed if they do have an alternative way of communicating for those who cannot hear or of hard of hearing. The basic and most used form of communication is by voice while speaking between patient and doctor/nurse. Hospitals can be calm or hectic, loud or quite that's also factoring how other people act. For those who are hard of hearing or deaf they would also need assistive communication devices that they are required to have other than an interpreter. I found this an interesting topic or important because in today's society we are now becoming more aware for those who need assistive technologies/interpreters. As a hearing person I feel that we take for granted the things that we are able to have while others don't have access to them. Since we don't see or hearing about assistive technology for that population, they are unsure if that is available for them to us and it's also a small percentage that someone in the hospital knows basics of sign language or know if the technology they have is up to date. To help I am assembling a lexicon of basic sign language.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Introducing Assistive Technology in the Classroom for Early Education

Presented by: Mia Hernandez, Project Mentor(s): Naomi Jeffery Petersen

Abstract: The need for assistive technology in classrooms can be a crucial part of student success or failure in their time throughout the school system. An estimated 7.3 million students require some type of assistive technology provided by their school district. This is approximately 14% of the total public-school enrollment and of that total, there is an estimated 19% of students who have specific speech or language impairment according to the Individuals with Disabilities Education Act. For students who struggle with verbal communication, the classroom can cause more harm than good. Students who need assistive technology may not be able to fully incorporate it into their daily lives. This may be caused by the lack of resources in the district, the lack of individuals who are certified to teach students how to use assistive technology, and the inability to incorporate this technology into a common education setting. I set out to look into current literature that highlights gaps for students who require assistive technology and what is considered best practice for the incorporation of said technology.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Mobility Access in the Clothing Section of the Federal Way, WA, Wal-Mart Supercenter

Presented by: Olivia Bentley, Project Mentor(s): Naomi Jeffery Petersen

Abstract: I will be conducting an observatory study at Wal-Mart Supercenter, 34520 16th Ave S, Federal Way, WA 98003. Shopping in the clothing section can be challenging for people with mobility issues because the clothing racks and displays may be crowded. This is especially important when people need to use assistive devices like motorized carts and walkers or are caring for children in strollers. It is important that people with mobility issues have barrier-free access to all public spaces, such as shopping for clothing. To determine whether Wal-Mart Supercenter in Federal Way, WA has a barrier free, accessible clothing department I visited the store to gather quantitative and qualitative data based on universal design guidelines and ADA standards. I considered various assistive devices, such as motorized carts and walkers. Recommendations for spatial arrangement are made based on the findings. Does the Wal-Mart in Federal Way, WA, meet the ADA standards and universal design guidelines?

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

More than accessibility: Universal design and universal design for learning in a STEM Laboratory

Presented by: Amanda Rosenzweig, Project Mentor(s): Naomi Jeffery Petersen

Abstract: Accessible teaching laboratories are limited as the number of students enrolling in STEM courses is lower (Sukhai et al, 2014). Universal Design (UD) and Universal Design for Learning (UDL) are frameworks to support the creation of learning environments, face-to-face and online, and curricula to accompany the learning. The environment and curriculum should be flexible and effective in meeting outcomes while maintaining the integrity of the course goals (CAST Inc., 2020). This project will focus on implementing or presenting possible implementations of UD and UDL to address students with sensory (hearing and visual impairments) and motor (mobility) impairment's ability to actively participate in the STEM laboratory. In addition, the project will concentrate on how to shift the focus from teaching to teaching with fewer barriers in the physical environment and presentation of content.

CAST Inc. (2020). The UDL guidelines. Center for Applied Special Technology.

Sukhai, M. A., Mohler, C. E., Doyle, T., Carson, E., Nieder, C., Levy-Pinto, D., Duffet, E., and Smith, F. (2014). Creating an accessible science laboratory environment for students with disabilities. Council of Ontario Universities 1-28

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Resources for Neurodivergent College Students

Presented by: Rachel Bailey-Pentz, Project Mentor(s): Naomi Jeffery Petersen

Abstract: Neurodivergent students face unique barriers in higher education including executive function, communication, and stigma. Some neurodivergent students start their higher education experience without the knowledge of methods, tools or resources that may be able to reduce the effects of their barriers. When starting a journey to obtain this knowledge, resources are spread out in several locations online, in books and literature and in trainings which can be difficult for students to locate. This project reflects the compilation of resources available to students as an accessible, categorized resource site that will be available for all students to reference.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Type One Diabetes: Misconceptions and Stigma

Presented by: Luke Stoner, Project Mentor(s): Naomi Jeffery Petersen

Abstract: Type one diabetes is by common knowledge, the lesser known of the two different predominate types of diabetes. The autoimmune disease characterized by insulin deficiency, as well as hypo- and hyperglycemia, leaves many individuals in a category of high dependence on modern medicine. There has been clear exponential growth in terms of treatment and overall quality of life available to those who may suffer from the disease, but many challenges still face these individuals in society today. It wasn't until this last century that diabetes was no longer to be known by the general population as primarily a death sentence and rather a condition in which someone may live and participate in community such as another. Although not everyone has the same experience in treatment and day to day function, there remain clear social boundaries in local communities still hold ideas that negatively portray those who may have type one diabetes. As an individual who is a type one diabetic, my personal experiences and interactions with other type one diabetics all seem to reflect a common pattern of discontent. It's overwhelming to realize that those who have the disease still face daily challenges with a slew of misconceptions and stigma fueling a false narrative that type one diabetics are just different everyone else. This project will overview some of these predominate ideas and furthermore highlight the ability of individuals rather than inabilities.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Accessibility Studies; Psychology

Universal Design Considerations for Exercise and Swimming Pool Facilities

Presented by: Christian Bacon, Project Mentor(s): Naomi Jeffery Petersen

Abstract: This study is a general observation of hotel fitness centers and their level of 2010 ADA compliance with inclusion of universal design structures. Observation of one facility and research on many other facilities show that an increased 2010 ADA compliance along with universal design structures fosters a more diverse community. Encouraging children and adults living with a disability to physically exercise and help with developing social skill for a diverse community. This study includes a personal letter stating an experience within an anonymous hotel that follows 2010 ADA but is missing universal design structures. This study takes a deeper looking into how universal design does more than just create equal access, it gives greater opportunities to individuals that would normally not have those opportunities to go out and exercise and socialize in an active environment.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Clinical Physiology; Exercise Science

Follow-Up analysis on hemodynamic parameters of Adult Patients with Mild to Moderate SARS-CoV-2 Infections after immunization

Presented by: Chicena Mortimer, Project Mentor(s): Ana Freire

Abstract: The aim was to perform a follow-up analysis on hemodynamic parameters and dyspnea of adults with mild to moderate SARS-COV-2 infections after immunization and compare with a control group. A prospective observational cohort study was performed including adults aged 20-40 years previously infected with SARS-CoV-2 who have expressed mild to moderate COVID-19 (COVG). A control group (CG) matched by age was also included. Procedures were conducted at baseline and six weeks after second shot of COVID-19 vaccination. Hemodynamic parameters were collected using manual sphygmomanometer to access blood pressure, respiratory rate was evaluated by visual inspiration rates, and dyspnea was evaluated by Medical Research Council Questionnaire (MRC). A descriptive data analysis was performed. For baseline

COVG presented mean of 118±8.36 mm/Hg for systolic blood pressure and 80±0 mm/Hg for diastolic blood pressure. Similar values were observed for CG: 113.33±8.16 mm/Hg for systolic blood pressure and 76.67±0 mm/Hg for diastolic blood pressure. After immunization COVG presented 110±15.81 mm/Hg for systolic blood pressure and 78±4.47 mm/Hg for diastolic blood pressure. CG presented 116±13.66 mm/Hg for systolic blood pressure and 76.67±8.16 mm/Hg for diastolic blood pressure. For dyspnea analyses both groups presented similar levels at baseline COVG presented a mean score of 0.48 ±0.79 and CG 0.22±0.42. After immunization the levels of dyspnea were sustained for both groups COVG 0.3±0.47 and CG 0.19±0.39. Respiratory rate was considered normal for both groups at baseline and follow up. We conclude hemodynamic parameters and dyspnea were similar between groups and no changes were observed after immunization.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Construction Management

Innovative Design and Construction of a Net-Zero Energy and Solar-Powered House

Presented by: Huy Nguyen, Kyler Nygren, Joel Moreno, Dilan Calva-Acevedo Project Mentor(s): Hongtao Dang, Darryl Fuhrman
Abstract: The construction industry accounts for 38% of CO2 emissions and generates 600 million tons of debris in the United States in 2018. Although there are many initiatives and advocates for sustainable practices and renewable energy, the destructive impact of construction activities remains a challenge. This paper investigates the design and construction of net-zero energy and solar-powered house in Ellensburg, Washington, United States. The project is a part of a national collegiate competition named Solar Decathlon Build Challenge, organized by the United States Department of Energy. The innovative design will be evaluated in ten contests: architecture, engineering, innovation, energy, water, health and comfort, home life, appliances, communications, and market potential. The contribution to the body of knowledge is 1) innovative design practices in the net-zero energy and solar-power house and 2) reflection and lessons learned on the design tradeoff that increase the affordability and constructability. The project will be locally built in Ellensburg, Washington, United States.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by Funding from Central Faculty-Student Provost Research Grant

Dance

A Dancer's Image

Presented by: Sydney Baker, Project Mentor(s): Therese Young, Gabrielle McNeillie

Abstract: Dancers are amazingly dedicated athletes who train for hours a day to try and perfect their craft. In doing so, they can become hyper focused on the details, picking apart every aspect of themselves and their technique. With so much time spent training, it can be difficult to take a step back and analyze the role the mirror plays in a dancer's training and everyday life. There are many factors that can affect a dancer's body image, including the social environment between educators and peers, social standards and social media, dance clothing, and so much more. This report will look specifically at how the mirrors can be a hindrance to female collegiate dancers by paving a way for mirror gazing and body checking.

With this information, it is hoped to show the difference in quality and overall well-being when dancing with the mirror opposed to dancing without the mirror. This information can also provide instructors with the knowledge and awareness of the effects of mirror gazing and body checking in students. Instructors will then be able to use this information to determine new methods of using the mirror as a positive tool to better help their students. This research will also encourage dancers to have conversations with each other about the importance of mental, emotional health, and body image to create change in the dance community. It is imperative that dance educators set their dancers up for success and use multiple ways of teaching and offering feedback to limit the amount of time a dancer is looking into a mirror. In making mental health a priority, dancers will be able to continue making art and sharing their passion with others.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Dance Capstone

Presented by: Sydney Baker, Jaelynn Tonder, Aislinn Williamson, Project Mentor(s): Therese Young, Gabrielle McNeillie

Abstract: The purpose of this presentation is to show the culmination of different performances, choreographic works, teaching experiences, and dance training we have been a part of during our time at Central Washington University. Through our respective websites, we are hoping to highlight specific elements that can be used in future professional dance endeavors. As we all have different goals for our futures in dance, we are able to demonstrate the different possibilities for what can come from our experiences and skills gained from the CWU Dance Program.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Electronic Engineering Technology

Analysis and comparison using different instrumentation amplifier

Presented by: Kalkidan Melaku, Project Mentor(s): Lad Holden Jeff Wilcox

Abstract: Build a circuit in Multisim and breadboard and compare an instrumentation amplifier to that of a similar IC packaged instrumentation amplifier in multisim and compare and contrast using captured data, schematics and graphs and build a sine wave generator and determine the components that affect the output of the system using capture data, schematics and graphs. The purpose of this project was to see the similarity and difference of the instrumentation amplifier output that was built to the similar IC packaged of instrumentation amplifier. Build a circuit of the a instrumentation amplifier that was choose for this project and have voltage input to get different voltage output and after that change the input voltage and see the difference or the similarity of the output voltage outcome.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Developing Process Control Labs and Simulations to Increase Student Comprehension

Presented by: Aidan McKee, Project Mentor(s): Lad Holden Jeff Wilcox, Greg Lyman

Abstract: The consensus between students and faculty in the EET program concerning the state of the course Process Control is that the class is complex and difficult to understand. This complexity, paired with labs that are disconnected from both the lecture material and prerequisite information, needs to be mitigated. The goal of this project is to increase student comprehension by relating the lecture material and mathematic concepts of prerequisite courses to the circuits and mechanical systems that are used in the real world. I studied the course material and supporting concepts comprehensively and obtained feedback from students and instructors that have participated in the class. This allowed me to develop supporting material across several platforms, including videos, mathematic models, circuit simulations, and updated lab instructions. Through research and feedback from both students and instructors, I have determined that the topics of greatest concern in the course are first-order, second-order, and state-space systems. To develop an understanding of these topics, the Multisim, MATLAB, Simulink, and LabVIEW programs are utilized. Additionally, the current labs have been reworked to be more readable and consistent, clarifying the student's responsibilities and providing logical pathways to understand the material. Throughout this project I have vastly increased my own understanding of Process Control technologies and concepts, developed ideas and strategies to support the curriculum of the course, and built a foundation of labs and programs for future offerings to implement.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Formula One Telemetry Analysis

Presented by: Andrew Struthers, Project Mentor(s): Lad Holden

Abstract: This presentation focuses on the decoding Formula One telemetry data in the form of encoded UDP packets by the simulator F1 2021 by Codemasters. Telemetry gathered by the simulator includes the player's car speed, steering, throttle, tyre temperatures, lap times, and more. Data analysis can be done on certain telemetry data in order to calculate information like average lap speed, tyre degradation levels, and predicted lap performance. This project will use a combination of C and Python to receive and display this data. Data will be sent out from the simulator in encoded UDP packets and received by a PIC24 16-bit microprocessor running C. All data analysis will be done in the microprocessor, and a new data packet including current speed, throttle input, brake input, steering input, and lap time will be formed. This new packet will be sent out via CAN communication protocol to a different microprocessor running a Python script. In Python, the new packet will be decoded, parsed, and displayed in real-time updating MatPlotLib graphs. This project serves as a proof of concept regarding data analysis and transfer on microprocessors using CAN communication protocols. Most modern cars do exactly this, especially in Formula One cars. Data analytics and processing is critical to success in a racing scenario.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Instrumentation of a BLDC Motor and Its Operating Characteristics

Presented by: Kollin Dix-Krebbs, Project Mentor(s): Lad Holden

Abstract: The brushless DC (BLDC) motor is electronically commutated instead of using brushes. The project monitors the current and speed of a BLDC motor under a load using a National Instruments (NI) CompactRio (cRIO) real-time embedded controller using LabVIEW. LabVIEW is used to program the sensors and motor driver for the BLDC motor using LabVIEW Field-Programmable Gate Arrays (FPGA) modules. The NI 9502 motor driver module is used to drive and control the BLDC motor in LabVIEW VI (Virtual Instrument). The hall effect current sensor which outputs the current as a voltage, will use a NI 9201 digital voltage input module to display the current in LabVIEW. The project aims to help people understand the functions and operating characteristics of a BLDC motor under a load.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: EET Program

Microcontroller Communication

Presented by: Mason Andrews, Project Mentor(s): Lad Holden

Abstract: The purpose of this project is to explore microcontroller utilization and communication beyond the scope of courses taken. SPI was created as a means of interfacing between one master device and many peripherals (slaves) by taking turns on shared communication lines. Peripherals are differentiated by their unique chip select line, which is used to indicate which peripheral the master is trying to communicate with. The Explorer 8 development board has 2 MikroBUS sockets on it, both of which communicate using SPI. This allows a processor installed on the board to act as the master device, while the devices installed in the sockets communicate with it serially. This project utilizes this setup to acquire data from one peripheral and route it through the master device to the other slave. By taking the digitally converted output from a thumbstick module and sending it to a bargraph module for visual presentation, one direction of the thumbstick can be represented by the illuminated segments on the graph. By utilizing the other direction as a way of manipulating a PWM generator, the brightness of the graph can be controlled.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: EET Program

Senior Project: Voice Recognition

Presented by: Angela Kivlehen, Project Mentor(s): Lad Holden, Jeff Wilcox

Abstract: This project simulates a system in which an output is controlled via voice commands. In this project, a graphical programming platform called LabVIEW was used along with a desktop microphone, LEDs, and resistors. The purpose of this project is to aid those with physical disabilities that may prevent them from manually activating a light in a room. If they are unable to use their hands, then lights that recognizes voice commands would be a beneficial alternative. Depending on the command that is stated into the microphone, an indicator on the front panel of LabVIEW will be activated simultaneously with the digital output using Data Acquisition, or DAQ, sent to the LEDSs on a breadboard. The code that was used was created by a youtuber named RAHULMNAIR, who provided the code to the public and is being modified for this project.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Solar Panel Mounted Ultrasonic Anemometer

Presented by: Gage Johnson, Project Mentor(s): Lad Holden

Abstract: The National Science Foundation (NSF) is funding research titled, Hybrid Experimental-Numerical Methodology and Field Calibration for Prediction of Peak Wind Effects on Low-Rise Buildings and Their Appurtenances. Because of the high wind that Ellensburg regularly experiences the Hogue Technology Building was chosen to record data on real world conditions. Pressure, strain, and acceleration are measured on the rooftop solar panel array of Hogue, and windspeed is measured on the roof approximately 50 yards north of the panels. Current windspeed measurements record unobstructed windspeed, but there is no data to understand how the wind is interacting with the solar panels. The goal of this project is to use a custom-made ultrasonic anemometer to record the wind speed and direction on the back plane of a single solar panel. This project uses four ultrasonic transducers two placed on opposite sides of a solar panel facing each other, and the other two 90 degrees apart from the previous two in the same configuration. Ultrasonic pulses will be sent from one sensor and recorded by the sensor opposite. This will be done in each of the four directions. Change in time of flight (TOF) of ultrasonic pulses is used to calculate the wind velocity in the plane of the four ultrasonic transducers. LabVIEW is used to configure the sensors, manage timing of different ultrasonic pulses, and collect TOF values. Collected data will be timestamped and integrated into the current collection system of the NSF project to correlate with already collected data.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Solar Power Microcontroller Fan

Presented by: Jahmal Rowe, Project Mentor(s): Lad Holden

Abstract: This project provides an energy efficient way to power a motor. The motor is controlled by the microcontroller and powered by batteries which is being charged by the solar panel. As solar power is fed into a battery charge controller, the battery charge controller will charge the battery until it is full. In a process called power pathing, if the power from the solar panel is larger than the power from battery, then the motor will receive its power directly from the solar panel. Otherwise, the motor will be powered by the battery. On the topic of batteries, battery protection must be in place to make sure that over-charge or over-discharge does not occur. Placing a couple of battery protection IC's (integrated circuits) will ensure that neither of these things will happen. A thermistor will be implemented in this system to provide accurate temperature measurements of the ambient air. This temperature measurement will be used to control the speed of the motor by sending the data into a microcontroller. The microcontroller will drive the motor to run faster the hotter the air around the thermistor is. The output of this instrumentation system will be monitored by a microcontroller and displayed on the microcontrollers LCD screen.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Exercise Science

Aging is Associated with a Downregulation of Genes Linked to Protein Ubiquitination and Glucose Metabolism in Human Skeletal Muscle.

Presented by: Colton Hart, Project Mentor(s): Jared Dickinson Jon Dickinson (Graduate student)

Abstract: Aging is Associated with a Downregulation of Genes Linked to Protein Ubiquitination and Glucose Metabolism in Human Skeletal Muscle.

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Skeletal muscle is known to change through the natural course of aging. However, our understanding of which specific biological processes may contribute to these changes are not fully understood. PURPOSE: To identify biological processes in aging skeletal muscle that are associated with genes downregulated in the skeletal muscle of older adults. METHODS: Skeletal muscle biopsy samples (vastus lateralis) were analyzed from healthy younger (27±3yr; 8M, 1F; BMI: 24.5±2.0) and older adults (68±5yr; 6M, 3F; BMI: 25.9±4.7 $kg•m^{-2}$). Muscle biopsies were obtained after an overnight fast under resting conditions and controlling for physical activity. Whole transcriptome next-generation sequencing (HISeq2500, Illumina) was performed on cDNA produced from isolated RNA. Differential gene expression between young and old was identified (with young as reference) using an adjusted p-value of <0.1 for comparisons between young and old. RESULTS: 20,810 genes were identified among all samples, from which we identified 729 genes that were considered to be downregulated in the skeletal muscle of older adults compared to young. Based on these specific genes, we identified 136 biological processes linked to downregulated genes, most notably biological processes related to protein ubiquitination and glucose metabolism. CONCLUSION: These data highlight that future research aimed to identify molecular processes associated with age-related declines in skeletal muscle function should include examination of protein ubiquitination and glucose metabolism processes.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Family and Child Life

Emerging Adults' Living Proximity from Home and Parent-Child Emotional Vulnerability

Presented by: Melissa Garrison, Alana Glaser, Michelle Meza, Riley Aguilar, Project Mentor(s): Amy Claridge

Abstract: Previous studies on emerging adults' relationships with their caregivers have provided contradictory results: while some studies have found that emerging adults with close parent-child relationships lived closer to their parents, others found that they lived farther away. The current study examined the association between emerging adults' living proximity from their primary caregiver and the level of emotional vulnerability in the parent-child relationship. Typical communication length between emerging adults and their caregivers was examined as a moderator. Data were collected from emerging adults ages 18-25 (N = 276) through an online survey method. Results revealed a significant positive association between emerging adults' living proximity from the caregivers and parent-child emotional vulnerability. Length of communication was not found to be a moderator. Findings may help to inform interventions related to family communication, empty nesting, and life transitions such as children leaving for college. Further research is needed to determine how various reasons for leaving the parent home may moderate the relationship between the variables.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Parent-Child Relationship and Attachment Security: Divorce as a Mediating Factor

Presented by: Caverna Headley, Hanna Bruning, Project Mentor(s): Amy Claridge

Abstract: Attachment is the bond that is formed linking a caregiver to children between birth and 2 years old and is a predictor for many future relationships. Attachment security is linked to later parent-child relationship quality. Divorce has been shown to affect children socially and they may experience difficulty in relating to others, but it is unclear how it continues to impact emerging adults and their relationships with their parents. The goal of this study was to better understand if attachment security was correlated to the quality of parent-child relationships among emerging adults and if parental divorce moderated this relationship. Our sample included emerging adults (N = 309) ages 18-30 years old. From our results, it was concluded that there was a significant positive relationship between the quality of the parent-child relationship and attachment security ($r = 0.43$, $p = <.001$) among emerging adults. Divorce did not moderate the association (Fisher's $z = -0.14$, $p = 0.44$). This study had a few limitations due to the limited sample size, and the snowball convenience data collection method that could make results less generalizable to the larger population. It is also not possible to make causal inferences due to the cross-sectional nature of the study. Despite the limitations, these findings could help set the foundation for which professionals and clinicians analyze and understand the influence of the quality of the parent-child relationship in emerging adulthood.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Parental Age and Parent-Child Relationship Warmth

Presented by: Meredith Craven, Madison Shinn, Ellie Chaffin, Nadia Gelle, Megan Clausen, Project Mentor(s): Amy Claridge

Abstract: Previous literature has found that there is a connection between parental age at the time of birth and parent-child warmth, but few studies have focused on relationships during emerging adulthood. The purpose of this study is to examine if the age of a parent at the child's birth was related to the parent-child warmth in emerging adulthood. Data were collected using an anonymous Qualtrics survey distributed via social media websites such as Instagram and Facebook. Eligible participants were adults between the ages of 18 and 30 (N= 177). Results indicated older parental age was associated with higher parent-child warmth in emerging adulthood such that individuals with older parents tended to report a warmer parent-child relationship. Future research needs to be done on this topic looking at moderators of the association between parental age and parent-child warmth.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Parental Conflict and Parent-Child Emotional Connection Among Emerging Adults

Presented by: Megan Johnson, Shae Petty, Kailey Pfeiffer, Sharissa Bird, Project Mentor(s): Amy Claridge
Abstract: The current study will attempt to fill a gap in literature by examining how the level of severity of parental conflict may correlate with emotional closeness in parent-child relationships. There is existing research on divorce affecting the quality of these relationships. However, divorce is not the only parental conflict that families experience. In addition to this, our research is especially important since we focus on a developmental stage (emerging adulthood) with limited research. The purpose of this study is to find if there is a correlation between the severity of parental conflict in childhood and children's report of emotional connection with their parents during emerging adulthood. The current study examined the relationships between the severity of parental conflict and the parent-child relationship among emerging adults (N = 208) by implementing an online survey through Qualtrics. The results indicated that higher levels of severity in conflict among parents correlated to lower levels of parent-child emotional closeness. Findings suggest that this could help parents understand that the relationship with their spouse may affect their future relationship with their child. Future studies should examine different cultures, age groups, number of siblings, and how positive interactions between parents may impact the parent-child relationship.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

The Impact and Efficacy of Psychosocial Support Practices For Grieving Families in Pediatric Health Care

Presented by: Caitlin Burkwist, Alyssa Madrigal, Project Mentor(s): Katy Tenhulzen, Amy Claridge
Abstract: Whether anticipated or unexpected, the death of a child is generally devastating to family members and significantly impacts family dynamics. Family members benefit from grief support well before the death, at end-of-life, and in their bereavement. Professionals, such as Certified Child Life Specialists and medical social workers, provide grief support in hospitals and palliative care or hospice organizations. However, there is inconsistency and lack of standardization in grief training for medical professionals. This presentation includes a review of research regarding the needs of parents and siblings around the death of an infant, child, or teen and the impact of pediatric grief and bereavement services and programming. Further, the presentation offers recommendations for professionals and organizations in providing effective grief support around the death of a child.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: Funding from Central Faculty-Student Provost Research Grants

Food Science and Nutrition

Assessment of Aflatoxin Exposure in School- Aged Children in Southern Ethiopia

Presented by: Melanie Dean, Project Mentor(s): Tafere Belay, David Gee, Susan Hawk

Abstract: Introduction: Aflatoxins(AF), a naturally occurring fungi are known to contaminate staple crops in low-income countries. Exposure to AFs may have detrimental effects on health such as hepatocellular carcinoma, immune suppression, and growth impairment. The aim of the current study was to examine the prevalence of AF exposure in school-aged children and evaluate its association with socio-economic and demographic characteristics and dietary intake of households. Methods: This study utilizes secondary data, from a cross-sectional study of 408 school-aged children. Urine samples were analyzed for AFM1 concentration. Moreover, socioeconomic, and demographic characteristics and dietary intake data were collected. Data were presented as frequency distributions, percentages, and means (SD). Skewed data and AMF1 concentration were log-transformed before analysis. Multiple Classification Analysis (MCA) was used for predicting the AFM1 concentration. Results: 93% of children had detectable urinary AFM1, the median concentration was 472.7 pg/ml. The MCA revealed that child age (p=.026), household size (p=.039), mothers' occupation (p=.005), consumption of haricot bean (p=0.010) and cow milk (p=.021), and dietary diversity score (p=.010)) were all significantly associated with AFM1 concentration. Conclusion: In conclusion, high exposure to AFM1 was observed in this study. Frequent consumption of certain food products and socio-economic status of households were significantly associated with AFM1 exposure. However, since the relation between AFM1 and dietary intake was analyzed based on self-reported data it is recommended that all of the staple foods, as well as animal feeds in the study area should be assessed for AFM1 contamination.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Associations between Atherogenic Markers and Hearing Loss: National Health and Nutrition Examination Survey: 2011-2012, 2015-2016

Presented by: Anna (Anya) Rombakh, Project Mentor(s): David Gee, Amie Wojtyna, Nicole Stendell-Hollis

Abstract: Hearing loss (HL) is a major public health problem affecting an estimated 1.5 billion of the global population that can lead to cognitive impairment, isolation and economic burden. Dyslipidemia, a known risk factor for cardiovascular disease and atherosclerosis, has been recently shown to be associated with hearing impairment. This study aimed to investigate the associations between such atherogenic markers and the degree of hearing loss using continuous NHANES data from cycle years 2011-2012 and 2015-2016. Utilizing Pure Tone Air Conduction Audiometry, laboratory and anthropometric data to analyze prevalence and odds ratios, this study included 8,955 adult participants ages 20-69. Results indicated that there were significant associations between gender, age, BMI and race/ethnicity and substantial hearing loss (p<.0001). No significant differences were identified between normal and substantial hearing loss in regards to mean concentrations of total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), non-high density lipoprotein cholesterol (non-HDL-C), and apolipoprotein B cholesterol (ApoB). Significant differences were identified between prevalence of triglycerides and substantial hearing loss (p<.0001). Multivariate logistic regression models found that after adjusting for covariates there was no significant association between having hypertriglyceridemia and substantial hearing loss (OR 1.2, 95% CI, 0.8-1.8).

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Development of a Performance Nutrition Manual for High School Athletes

Presented by: Kadi Grieve, Project Mentor(s): Kelly Pritchett

Abstract: Adolescence is a time of profound growth and change, which makes adequate nutrition critical for meeting the growth and development needs of the high school athlete (Desbrow, 2021). Furthermore, athletes have higher energy intake needs than non-athletes due to increases in energy expenditure from training, and competition. Currently, many adolescent athletes do not meet their nutrition needs and lack the education and resources needed to properly fuel for their sport. In order to increase nutrition education amongst high school athletes, a sports nutrition manual was developed and will be available for download at no cost on both the Washington State Dairy Council (WSDC) and the Washington State Interscholastic Activities Association (WIAA) websites. The intent of this manual is to provide high school athletes, parents, and coaches with a free and comprehensive nutritional resource that will improve the dietary knowledge and habits of adolescent athletes and enhance athletic performance. A literature search was conducted using Pubmed, Medline, and the National Institute of Health (NIH) to obtain evidence-based sports nutrition information. Topics covered in the manual include: macronutrient needs (carbohydrates, lipids, and proteins), micronutrient concerns and needs (iron, vitamin D, and calcium), hydration, pre and post exercise fueling, example fueling plates, eating for recovery, ergogenic aids, simple meals to cook at home, navigating the school cafeteria and fast food options, grocery shopping, as well as disordered eating and relative energy deficiency in sports (RED-S). Furthermore, future research is warranted to evaluate the efficacy of improving nutrition knowledge in high school athletes.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Does an Increased Intake of Eating Out at Restaurants Increase a College Student's Knowledge on Food Origins?

Presented by: Samantha McDaniel, Project Mentor(s): Dana Ogan, Ethan Bergman, Timothy Englund

Abstract: Eating out is a popular activity for college students, it provides an opportunity for them to socialize and enjoy their meals. Students eating away from home has increased from an average of 2.1 times per week in the 1990s to an average of 6-8 times per week. College students are more likely to eat out than other groups. Having a better understanding about the origins of food may help to inform and affect a student's knowledge. The purpose of this study is to evaluate if an increased rate of eating out affects college students' knowledge of food origins. A survey instrument titled "Around the World in Eight Plates," originally developed by researchers from the Menus of Change University Research Collaborative (MCURC) was used. This survey, plus an additional question measuring how many times per month students ate out was administered at Central Washington University (CWU) in the Winter 2022. The survey was originally used as an educational tool among university students, but the goal of this study was to compare eating out frequency with successful matching of food origin. The survey asked a sample of participants (n=155) to match 8 different foods to their country of origin. Participants were also asked how many times a month they eat at a restaurant. Eating out was not correlated with a student's ability to match food to their country of origin. The results from this survey warrant further research into food origin knowledge and how eating out influences students' knowledge on food origin.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

How Food Literacy Impacts the Ability to Match Food to Country of Origin in the "Around the World in 8 Plates" Survey

Presented by: Mallory Isley, Project Mentor(s): Ethan Bergma, Dana Ogan, Tim Englund

Abstract: Food literacy is an emergent term in public health nutrition literature that is used to describe proficiency in food-related skills and knowledge to ensure adequate nutrition and an overall healthy dietary pattern. The term has often been used in questionnaires, but few studies have specifically assessed food literacy among college students. Having interventions that are focused on improving food literacy skills, during such a critical period for young adults, is beneficial for increasing food knowledge and understanding. Therefore, the goal of this present study was to utilize an interactive survey called Around the World in Eight Plates and compare it to self-perceived food literacy among college students. The original instrument, which had students match eight dishes to eight countries of origin, was developed by researchers from the Menus of Change University Research Collaborative (MCURC). An item, asking students about self-perceived food literacy, was developed through a literature review and added to the original instrument as the main research question. Students at Central Washington University (CWU) were invited to participate in the survey (n=161) at multiple locations on CWU's campus. A total of 155 students were included in the final analysis. No significant correlation was found between students' number of correct answers on the survey and students' self-perceived food literacy. Researchers discussed how misunderstanding or misinterpretation of the food literacy-related question could have affected these results. Further research is necessary to determine what additional reasons may exist for this finding.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Investigating the Effects of Body Weight Fluctuations on Insulin Resistance in Adults: an NHANES Study

Presented by: Jessica Burke, Project Mentor(s): David Gee, Susan Hawk, Dana Ogan

Abstract: The aim of this study was to investigate the effects of weight cycling on insulin resistance (IR) utilizing the 2015-2020 NHANES database. A value greater than 3.2 for homeostatic model assessment of insulin resistance (HOMA-IR) was used to define IR. No study to date has examined the weight cycling question since its application in 2015. RESULTS: 53% of the total 4100 participants reported weight cycling at least once, and 33% of the total were classified as having IR. Prevalence of IR and obesity were highest amongst those who weight cycled three times or more, and diabetics were more likely to weight cycle than non-diabetics. A positive association was found for history of weight cycling and average BMI, maximum historical BMI, waist circumference, and HOMA-IR. Simple logistic regression showed that weight cycling three times or more substantially increased the odds of becoming obese (OR 4.415, $p<.0001$). After adjusting for obesity, age, gender, and ethnicity, any history of weight cycling revealed no significant effect on a person's odds of developing IR. Rather, obesity was the largest predictor of IR independent of other confounding variables –an obese person was 8 times more likely to have IR than someone of a normal or overweight BMI ($p<.0001$). These results suggest that weight cycling does not increase one's risk of IR but is associated with an increased risk for obesity. Findings of this study has implications for clinicians and specialists as they formulate the most effective and sustainable weight loss or maintenance plan for their patients.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Nutrition education manual for parents and caregivers in rural areas of Western Africa

Presented by: Saran Sidibe, Project Mentor(s): Tafere Belay, Kelly Pritchett, Dana Ogan

Abstract: Even though progress against childhood malnutrition has been made, millions of children under the age of five still suffer from the global burden of the disease. The introduction of nutrition education for parents is crucial for improving children's health outcomes considering that parental participation in nutrition education interventions can help prevent or treat undernutrition among children. Otherwise, the developmental, medical, social, and economic impacts of malnutrition are significant and lasting, for individuals and their families, as well as countries. Therefore, a nutrition education manual for parents was developed to create awareness in order to decrease the prevalence of malnutrition among children. For this project, four different chapters with specific topics exploring signs and symptoms, and consequences of malnutrition, as well as different ways to reduce malnutrition were written in simple, everyday terms that a layperson can understand. Each chapter was accompanied by pictures that demonstrate proper feeding, cleaning, and holding techniques. In Addition to pictures, a list of Quick Response (QR codes) containing supplemental resources on the nutrition-related topic for each chapter was also provided. With the completion of this project, parents can use this resource to gain basic nutrition knowledge which could positively affect their children's health outcomes. Furthermore, future research should put this project into practice and evaluate its effectiveness in reducing childhood undernutrition.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Risk of Low Energy Availability, Disordered Eating, and Menstrual Dysfunction in Collegiate Female Runners

Presented by: Leah Dambacher, Project Mentor(s): Kelly Pritchett, Robert Pritchett

Abstract: Distance runners may be at risk for disordered eating (DE) habits and low energy availability (LEA) due to increased energy expenditure with or without decreased energy intake, which leads to negative health and performance outcomes, such as menstrual dysfunction. Purpose: This study investigated risk of DE, LEA, and estimated the prevalence of menstrual dysfunction (MD) among female collegiate runners. Methods: Female runners (n = 325) who compete on an NCAA Division I, II, or III cross-country and/or track team completed an online questionnaire (45 questions). This included the Low Energy Availability in Females Questionnaire (LEAF-Q) which examined incidence of stress fractures, occurrence and frequency of menstrual cycles within the previous 12 months, contraceptive use, and gastrointestinal function. The Disordered Eating Screening Assessment (DESA-6) was included to examine risk of DE. Runners with MD (oligomenorrhea and amenorrhea) were defined as reporting < 9 cycles within the previous 12 months. Those taking hormonal birth control were excluded from this analysis. Results: A high prevalence of athletes were at risk for LEA (56.6%), with 184 athletes scoring > 8 on the LEAF-Q. 42.5% were at risk for DE, and 13.2% of athletes reported menstrual dysfunction. Conclusion: Consistent with previous literature, a substantial percentage of athletes were found to be at risk for DE and LEA. These findings, along with a high prevalence of MD, demonstrate that collegiate female runners are at risk for health and performance consequences associated with LEA and DE.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Risk of Low Energy Availability, Disordered Eating, and Menstrual Dysfunction in Female Recreational Runners

Presented by: Marissa Miles, Project Mentor(s): Kelly Pritchett, Robert Pritchett, Abigail Larson
Abstract: Running is characterized by high physiological demands with an emphasis on weight, which may lead to a greater risk of developing low energy availability (LEA) and or disordered eating (DE). Recreational runners are a population that is often overlooked due to a lack of resources readily available to them such as registered dietitians, physicians, and therapists. Purpose: This study investigated the prevalence of menstrual dysfunction, risk of DE and LEA. Methods: Female recreational runners (n= 2,434) running a minimum of 21 miles a week completed an online questionnaire that included the Low Energy Availability in Females Questionnaire (LEAF-Q) (occurrence of stress fractures, menstrual function, contraceptive use, and gastrointestinal function) to evaluate LEA risk, and the Disordered Eating Screening Assessment (DESA-6) (weight control methods, weight satisfaction, and self-reported diagnosis of eating disorders (ED)/DE) to evaluate DE risk. Chi-square tests analyzed the presence or history of an ED and menstrual function. Results: 55% of participants are at risk for LEA based on a score of > 8 on the LEAF-Q, 39% are at risk for DE based on a score of >3 on the DESA-6, and 30% reported menstrual dysfunction. Conclusion: Female recreational runners have a high risk for LEA and DE. Furthermore, recreational athletes may not receive the needed treatment due to a lack of resources available to them. These results reinforce the need for further education and preventative measures around LEA and DE amongst recreational female runners.
Key Words: Low energy availability, disordered eating, recreational runners
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

The Effect of Dietary Factors on the Prevalence of Multimorbidity that Increase the Risk of COVID-19 Severity in U.S. Adults

Presented by: Ella Carroll, Project Mentor(s): David Gee, Dana Ogan, Susan Hawk
Abstract: Most of the U.S. population is not meeting the Dietary Guidelines for Americans (DGA) which puts them at risk for multimorbidity (≥ two risk factors) that increases the risk of severe COVID-19 outcomes. The aim of this project was to investigate how dietary factors affect the risk for multimorbidity. This project was an observational cross-sectional study, using the National Health and Nutrition Examination Survey's (NHANES) questionnaire, laboratory, examination, and dietary data from the years 2015-2018. Data from 10,530 subjects, ≥ 20 years of age, non-pregnant and/or lactating were analyzed. Underlying medical conditions identified by the Centers for Disease Control and Prevention were quantified and assessed for prevalence of multimorbidity. Rao-Scott chi-squared analysis was used to determine significant differences in the prevalence of multimorbidity. Forty-five percent of the population had multimorbidity. Those who did not meet recommendations for saturated fat and fiber intake had a higher prevalence of multimorbidity (46.3% and 45.8%, respectively). Those who did not meet recommendations for alcohol intake had a lower prevalence of multimorbidity (42.8%). Odds ratios for multimorbidity was established for those who did not meet the DGA compared to those who did. Fiber: (OR 1.4, $p \leq 0.0001$); Saturated Fat: (OR 1.13, $p = 0.016$); Alcohol: (OR 0.85, $p = 0.042$). Sodium and total sugar intake had no significant effect on multimorbidity. The results of this study indicate that those who did not meet the fiber and saturated fat DGA recommendations may be at an increased risk for multimorbidity that increases the risk of COVID-19.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Thyroid Hormone was Associated with Obesity in Adolescents aged 12 - 19 years in the United States: Data from National Health and Nutrition Examination Survey (NHANES) 2011 – 2012

Presented by: Maya Jensen, Project Mentor(s): Tafere Belay, Susan Hawk, David Gee
Abstract: Introduction: Obesity is a highly complex disease that is increasing in prevalence globally. In the United States, 21.2% of adolescents aged 12 to 19 are obese. Despite its increasing prevalence, there is still much to learn about the disease. An area of controversy in obesity research has been the effect of thyroid hormones on obesity. Therefore, this study sought to investigate the relationship of thyroid hormones with obesity in adolescents in the United States. Methodology: 355 adolescents were sampled for obesity and thyroid hormone markers in the 2011 to 2012 NHANES dataset. The 2011 to 2012 NHANES dataset had the most recent information available on thyroid hormones. Percentages, frequency distributions, means (SD) were used as appropriate in describing the socio-economic and demographic characteristics of subjects, thyroid hormone markers and obesity. Multiple linear regression analysis was used to examine the relationship between obesity and independent variables. Results: BMI was significantly associated with triiodothyronine (TT3), thyroid stimulating hormone (TSH), family monthly poverty level, and hours spent on computer past 30 days. Waist circumference was significantly associated with TT3, TSH, and family monthly poverty level. Conclusion: This study showed that thyroid hormone markers were significantly associated with both obesity indicators, however, further research is warranted on a larger sample size.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Hospitality, Tourism and Event Management

Perceptions of Overcrowding in National Parks

Presented by: Megan Robins, Lucy McCoy, Project Mentor(s): Carla Jellum
Abstract: The purpose of this research is to understand what people's perceptions are towards overcrowding in National Parks, identify what strategies visitors employ to escape overtourism, and explore their thoughts on regulating visitation. Current research and National Park data suggests that recreational visits to National Parks and public lands is increasing. Increased pressures to use public lands threatens their natural integrity and may impact visitor experiences. Data was collected using a questionnaire administered to respondents via Instagram in February 2022. The goal was to obtain responses from students approximately 18 – 24 years of age, who currently attend universities and colleges in Washington state. A total of 42 questionnaires were collected, which included qualitative and quantitative responses about respondent demographics, tourism activities and experiences, perceptions of crowding and permit/reservation systems. Research findings suggest that the primary characteristics of overcrowding are viewed as lack of personal space and difficulty maneuvering around the destination, with 60% of respondents experiencing National Park overcrowding. Avoidance strategies included visiting during off-peak times and respondents favoring a permit/reservation system. This research provides insight into overcrowding in National Parks and the impact on visitor satisfaction and experiences, with consideration of implementing permit/reservation systems to gain access to public lands.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

ITAM - Information Technology and Administrative Management

Why Smartphones are so Difficult to Repair and What we Can do About it?

Presented by: Kevin Lomax, Project Mentor(s): Susan Rivera

Abstract: This session will outline what manufacturing practices are most significantly attributing to short product life spans for smartphones, the damage these devices have on the environment, and how right-to-repair combats these issues. Research began with literature reviews showing smartphones' highly damaging impact on the environment throughout their life cycles. The focus then shifted to methods of increasing these lifespans using repairability as the catalyst for this change. Later, an interview with a repair shop owner, right-to-repair activist, and industry professional helped identify the primary unsustainable practices targeted by right-to-repair legislation. These targeted practices include software locks on components such as camera modules and manufacturers' policies to withhold schematics and repair parts to consumers or repair businesses. Even with the negative public relations backlash that companies, such as Apple, receive for unsustainable manufacturing practices, the practices persist. Because social pressure has not been enough to facilitate change, right-to-repair legislation is a powerful tool to implement meaningful progress concerning ownership rights and reducing harmful practices for the environment.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Mechanical Engineering Technology

ASME RC Baja Project, Drive train and Steering Components

Presented by: Cam Jamison, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire

Abstract: To satisfy the Mechanical Engineering Technology program requirements a senior project was accomplished with an RC car build. An RC car was designed, manufactured, and tested to meet all requirements set forth by American Society of Mechanical Engineers (ASME) RC Baja competition. A two-person team was assembled to build the RC Car. Teammate Paul Lervick was responsible for the suspension and chassis components and the other was responsible for the drivetrain and steering components. During the fall quarter drawings and general designs were created. Many different RC cars and motorized vehicles were referenced when initially coming up with aesthetic ideas. After having a general idea on appearance, engineering analyses were calculated. Several torque analyses were made on gears to assure they would hold up under the power of the 3800Kv motor. Steering component geometry was analyzed after finding the desired steering arm length of 93.75mm. After several analyses were made, decision matrices were created to decide which materials were most appropriate to manufacture components out. After design and analysis came manufacturing and construction. Most components were 3D printed and purchased. Multiple machining processes were utilized to modify parts for fitment and aesthetics. With a fully constructed RC car, testing began. The RC car met the steering requirement of articulating left and right at the desired 60 degrees, and also reached 25 mph top speed as calculated. Additional tests include a slalom course and a drop test.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Balsa Wood Vertical Lift Bridge

Presented by: Emeri Wilson, Project Mentor(s): Charles Pringle, Dr. Jeunghwan Choi
Abstract: How can college students demonstrate the cumulative knowledge and skills acquired during their time in the Mechanical Engineering and Technologies program at Central Washington University? Students were asked to complete a senior project to display their skills, in this case a Balsa Wood Bridge was selected to highlight the student's capabilities. The ability to design, manufacture and test the Balsa Wood Bridge draws from competency in Strength of Materials, and Statics, specifically, truss analysis. This along with experience in computer modelling programs such as Solidworks and MDsolids, and manufacturing experience in the CWU Woods lab led to the completion of a Balsa Wood Bridge. Some of the bridge building processes included visual inspection of the balsa wood, measuring, cutting, and sanding the balsa wood before fastening it together with wood glue. The resulting Balsa Wood Bridge meets several design requirements that were previously decided upon by the project white paper. The bridge can successfully support a load of 20kg while traversing a span of 400mm. The bridge also can articulate vertically 200mm with the use of a modified fishing reel where less than 5g of force is exerted. The total weight of the bridge is less than the limit of 85g, weighing only 79g. The design, manufacturing, and testing of the Balsa Wood Bridge senior project successfully highlights the students' abilities that were cultivated through the MET program at CWU.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Design and Construction of a ROAR Approved MET RC Baja Race Car

Presented by: Joseph Fritz, Project Mentor(s): Dr. Jeunghwan Choi, Chris Buchanan
Abstract: The goal of this project is to develop an RC car to compete in the MET RC Baja competition. A car will be constructed to be as lightweight, durable, and fast as possible while abiding by ROAR (Remotely Operated Auto Racers) regulations. As such, suspension, steering, chassis and drivetrain systems will need to be devised to form a complete vehicle. The chassis must provide mounting points for all other components of the vehicle and provide a rigid platform in order to create a stable vehicle. The suspension must operate smoothly, allowing for at least 1 inch of ground clearance, and allow the vehicle to transverse a variety of terrain including a 2-foot jump. The steering must be predictable, with less than 5 degrees of bump steer and allow for a less than 2 foot turning radius. These requirements will be achieved through extensive analysis and design of the suspension and chassis components. This project will focus on the suspension, steering, and chassis aspects of the RC car. The drivetrain aspects will be developed by teammate Rachel Krill. The analysis of all systems will involve static structural, kinematic, fatigue, and geometric analysis. The resulting vehicle is ROAR legal, can travel at speeds of 30mph, has approximately 1 inch of ground clearance, weighs 3.5 lbs, has a turning radius of less than 2 feet, and can complete all required tasks for the met RC Baja competition.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

JCATI Carbon Fiber Recycler; Delamination System

Presented by: Aaron Eastman, Project Mentor(s): Charles Pringle, Dr. Jeunghwan Choi, Chris Berkshire, Bo Nielsen, Austin Taylor

Abstract: The production of composite wings at Boeing causes carbon fiber waste and CWU Mechanical Engineering Technology students have been tasked in designing a carbon fiber recycling system. This project was brought forth and funded by the Joint Center for Aerospace Technology Innovation (JCATI). There are three subsystems that make up the carbon fiber recycling system, the delamination system, shredding system and the oven. The purpose of this project was to increase the efficiency and effectiveness of the delamination system of the carbon fiber recycling system. The old system reached approximately 50 percent delamination with one pass through the system, and the center of the housing deflected near 0.125 inch during the crushing process. To increase the effectiveness of the delamination system, the shear modulus of the carbon fiber drove the design requirements to ensure enough crushing force would be applied. The shear modulus was able help determine the needed torque and crushing force of 8750 pounds. In order to meet the needed torque, the input torque was tripled by a group member and another set of crushing wheels was added to the design. With the carbon fiber strips being crushed twice a greater percentage of delamination will be reached. To ensure the housing deflected less, a more rigid frame was designed made of 14 angle iron members welded together. Initial testing has found that the carbon fiber strips now reach 90 percent delamination, and the housing only deflects .05 inches at the center of the frame.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

JCATI Carbon Fiber Recycler: Oven Enclosure

Presented by: Maggie Romero, Project Mentor(s): Charles Pringle, Bo Nielsen

Abstract: Central Washington University partners with Boeing and is funded by the Joint Center of Aerospace Technology Innovation (JCATI) to develop a mechanism that takes carbon fiber wing trimmings from Boeing that are resin coated and recycle carbon fiber. This is done by crushing the wing trimmings and then putting it into a 500°C oven to melt off the resin. This project focuses on the enclosure for the oven and making sure precautions are met such as having the outside surface be less than 45c through heat transfer analysis, argon does not purge more than 10scfh through fluid dynamics analysis, and 99% of the resin is removed through thermodynamics analysis. This is done by using a thermocouple to measure the temperature, an oxygen meter to measure the purging of argon, and a scale to measure the change in weight as the resin is removed. The design that meets these criteria has two 20-gauge steel sheet enclosures that fit within each other, and in-between is 2-inch mineral wool insulation. This was manufactured using a CNC plasma cutter and welding. Overall, the outside surface measured to be 50 °C, 5 °C more than what was predicted. The oxygen meter measured 1% oxygen in the system meaning that the purging of argon was lower than 10scfh. Finally, the change of mass between before and after the carbon fiber was in the oven showed to have a change of 0.2g which shows to have a 99% resin removal based on the calculated mass flow rate.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

JCATI Carbon Fiber Recycler: Oven Heating System

Presented by: Sean Tomkins, Project Mentor(s): Charles Pringle Chris Berkshire, Instructional & Classroom Support Tech

Abstract: What happens to carbon fiber from airline wing tips when their service life ends, and they get replaced? Throwing them away would be wasteful, the Joint Center for Aerospace Technology Innovation (JCATI) project can extract the carbon fiber from airline wing tips to be reused. The JCATI project is a continuation from the work done by previous senior class engineering students and has a new set of issues to be addressed each year. This year there was a need for a new oven system for the JCATI carbon fiber recycler with this project's focus being on designing the oven's heating system to reach an overall temperature of 500°C ± 5°C in 15 minutes and to be able to hold that temperature for 30 minutes. Twelve mathematical analyses were conducted during the designing of the heating system to determine design parameters such as voltage/power required and stresses/forces the system will encounter while running. Then the oven heating system was built in three sections, heating controls, heating cartridges, and the thermocouple assemblies with some parts being manufactured/created in house whilst others were purchased through outside vendors. The new heating system device demonstrated good performance with it taking approximately 14 minutes and 23 seconds on average to reach the required temperature threshold 500°C ± 5°C and the actual temperature was the same as the displayed temperature. The device was also able to hold an average temperature of 500°C ± 5°C for the 30-minute cycle needed to run the machine.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

JCATI Carbon Fiber Recycler: Shredder

Presented by: Parker Sudderth, Project Mentor(s): Charles Pringle, Dr. Jeunghwan Choi, Chris Berkshire, Bo Nielson

Abstract: This project is a potential solution to keep the carbon fiber waste from airplane manufacturing to a minimum, sponsored by the Joint Center for Aerospace Technology Innovation (JCATI). The design and assembly will be scalable for future industry application. The overall design of the whole carbon fiber recycler consists of a crusher, shredder, and oven. This report is on the caron fiber shredder module. The shredder is tasked with being able to shred the delaminated carbon fiber scrap that directly comes from the crusher. The operation must produce shreds in the proper size to be gathered and delivered to the oven module. During the manufacturing process, engineering methods were used to find proper requirements of the design. The material strength of carbon fiber is calculated with the goal of finding the required force to yield thus breaking the material. The dynamic calculations are done to find the moment of inertia required to reach such a force. Lastly the static calculations find the requirements of the frame and housing plates to be sure that all reaction forces are supported. Multiple tests of the carbon fiber recycler were conducted. The results showed that the shredder produced fibers measuring half an inch on average. With multiple operations the shredder never bound when cutting the carbon fiber. The lowest speed it experienced was 413 RPMs. The last test done was on the vibrations during operation. While cutting carbon fiber the maximum deviation was 0.0075-inch. In conclusion, the device was successful and safe to operate.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

JCATI Crusher Drive Train

Presented by: Matthew Denchel, Project Mentor(s): Charles Pringle, Chris Berkshire

Abstract: This project is sponsored by JCATI (Joint Center for Aerospace Technology Innovation) to research and manufacture a machine to recycle strips of carbon fiber from retired aircraft wings. The drive train powering the crushing wheels was not delivering enough power into the crushing wheels to completely delaminate the strips of carbon fiber. Another issue experienced was the spur gears transferring power between crushing shafts failed. This issue was first approached by analyzing the gear reduction ratio powering the crushing wheels. Then the next analysis was performed to find the amount of torque required to delaminate the carbon fiber. The minimum delamination of the carbon fiber was calculated to be 2114 lb-ft. Once this was complete it was realized the gear reduction ratio needed to be increased in order to output more torque into the crushing wheels. The gear reduction ratio was accommodated by increasing the gear reduction ratio from 2000 lb-ft to 2500 lb-ft. The failing spur gears were re-analyzed using a spur gear analysis. The previous set of spur gears were analyzed with a diametral pitch of 8 with 64 teeth on the gear. The new set of gears were redesigned with a diametral pitch of 5 with 40 teeth on the gear. The increase of the gear reduction ratio allows for the crushing wheels to achieve 2500 lb-ft of torque, achieving complete delamination of the carbon fiber strips. The decrease of diametral pitch from 8 to 5 allows the spur gears transfer power without part failure.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

LJM RC BAJA VEHICLE PROJECT CHASSIS, AND SUSPENSION

Presented by: Paul Lervick, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire

Abstract: An RC car was designed, analyzed and manufactured to compete in the ASME RC Baja competition. The focus was to optimize the suspension and chassis components to minimize the weight while maintaining the structural strength of the components which would intern supplement the overall speed and stability of the vehicle. Other components were the responsibility of the teammate Cam Jamison. To complete this there was extensive research done on Traxxass RC cars and what went into making a high performing vehicle that would compete well in the 3 races that comprise the competition (slalom, sprint, and obstacle course). There were then designs produced using structural stress analysis with methods from statics, mechanics of materials, and mechanical design. Moreover, 3D Computer Aided Design and Finite Element Analysis was used for more complex loading scenarios to thereby increase or reduce the cross-sectional area where necessary. The manufacturing process of 3D printing was used for the creation of the suspension components as it allowed the use of light weight yet strong materials and the manufacture of complex component designs that would otherwise be tremendously challenging to produce in a timely and cost-effective manner. The car surpassed its expectations after the optimization of the final assembly. The stiffened suspension allowed for a 10% decrease in the compression of the coils on the 3-foot drop test of the vehicle. Meeting all the requirements allowed the car to complete the slalom test, sprint test and obstacle test on average 10% faster than predicted.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

RC Baja

Presented by: Sean Gordon, Project Mentor(s): Dr. Jeunghwan Choi, Chris Birkshire
Abstract: Students at Central Washington University were challenged with constructing a RC Baja car capable of competing against other universities from around the state as a comprehensive senior project. These projects were completed in teams of 2 separated into the suspension and chassis, as well as steering and drive train. Completion of this car requires the ability to complete several tests the measure each component of the car working in unison. Testing begins with a straight-line sprint to determine the top speed of the car; this test will be followed by a slalom test to determine steering capabilities. The final test consists of a Baja track that tests suspension steering and speed in one challenge competing against other RC cars. The RC car demonstrated successful test with its ability to achieve a turning angle of 110% of the calculated value when moving forward through the slalom test without interference from components on the RC car. When undertaking the Baja track test the suspension system experienced a compression and expansion distance of .75 inches in both the front and the rear suspension as opposed to the predicted .5 inches. The straight-line sprint resulted in a maximum speed recorded at 20 mph being only 80% of the predicted top speed of the car per calculations completed prior to testing. These results were gathered using timers and calipers used while the car is stationary prior to testing.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

RC Car Drivetrain and Steering

Presented by: Jacob Swift, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire
Abstract: To test engineering discipline, two students in the Mechanical Engineering Technology department at Central Washington University will be tasked with interpreting ROAR (Remotely Operated Auto Racers) restrictions and RC car design guidelines to create an RC car capable of competing in RC Baja race environments.

The design of the drivetrain mimicked that of an actual automobile. Through an understanding of torque, inertia and gear design, an open differential was designed. The final design consisted of a 2:1 and 4:1 spur gear pair with an open differential consisting of three 1:1 miter gears. The primary engineering methods used to create the assembly were turning, 3D printing and drilling. Gears and supports were 3D printed due to irregular shapes, while the axles were created by turning aluminum rounds to a desired diameter. Certain parts were purchased based on their difficulty of manufacture, such as universal joints, wheels and all electronics.

Due to the project being divided between two students, only the steering and drivetrain will be discussed here. For the steering, the system consisted of a servo mounted to the front of the car, with two tie rods connecting to rotating feet. This design will successfully meet the requirements of turning the wheels 60 degrees in each direction. As for the drivetrain, this design will fulfil the requirements of reaching a maximum speed of at least 25mph while gear teeth remain intact.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

PC RC Baja: Steering and Drivetrain

Presented by: Pablo Ruelas, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire

Abstract: Students participating in the American Society of Mechanical Engineers (ASME) RC Baja competition are expected to work in teams of two to create an RC car from their own design to compete in a race and off-roading competition, as well as meeting the requirement of holding a top speed of at least 15mph. The students of team PC RC Baja used various methods to create the parts necessary for a functional RC car. Parts such as the gearbox and differential-box were 3D printed to incorporate their complex designs, and because they're used as housing and not expected to withstand substantial load. Other parts such as the multiple drive shafts, shock towers, and chassis were machined from aluminum and steel, because they are expected to withstand substantial load and provide torque for the RC car. Finally, many parts were purchased for various reasons, such as the motor, servo, and motor controller and RC remote because of their complexity and importance. Other parts like the gears, shocks, and tires were purchased because the students simply didn't have enough time to create these parts on time. The RC car is functional and ready for testing. The RC car has an 8:1 gear ratio and has a top speed of 30mph.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

R/C Baja Truck: Suspension, Chassis and Steering

Presented by: Ryan LaFrombois, Project Mentor(s): Dr. Jeunghwan Choi, Charles Pringle, Chris Berkshire

Abstract: The ASME RC Baja Challenge is an annual competition that the Central Washington University Mechanical Engineering and Technology (MET) department takes part in. Senior level engineers divided the work between the drivetrain and the chassis/suspension while designing and manufacturing to meet a set of requirements. Next, a device was to be developed to be able to withstand the extreme forces to be successful in the competition at the end of the year. The process would require that the students use their acquired knowledge and skills to design, manufacture, and analyze a capable device. Designing involved the completion of 12 analyses to create parts capable of withstanding the set of requirements. Stress and shear analyses were conducted on all suspension components. Spring force was determined to find the necessary spring rate. From the analyses, various parts were either 3D printed or machined to construct the sub-assemblies making up the chassis and suspension. The manufacturing of the cantilever suspension involved the machining of the rocker arms while the rest of the suspension components were 3D printed out of PLA. The sub-assemblies were then mated together to create a functioning device. The outputs of these analyses allowed the parts designed for the suspension to support the chassis and its components with two inches of ground clearance. The suspension compression was 10% more than the 1.5 inches predicted in the 2-foot drop test. The manufacturing and overall assembly of the device completed the goal of a capable device for the competition.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

R/C Baja; Suspension & Chassis

Presented by: Matthew Hart, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire, Charles Pringle

Abstract: The ASME RC Baja is a competition that tests engineering students' ability design, build, and test an RC car. The vehicle then competes against other engineering student's RC cars. The objective is to manufacture the most efficient and cost-effective RC Baja car.

During the first quarter of senior project, the student' engineering skill was applied to designing an RC car that will be able to compete in a competition at the end of spring quarter. The student was tasked with using all the information from the classes the student had taken previously at Central Washington University and design and build an RC car to the best of the student's ability. During the winter quarter the student was put to the test to manufacture the car that was designed in the previous quarter by using the 3D printers that prints in PLA plastic and using the CNC plasma cutter to cut out the aluminum sheet for the chassis plate. For this quarter the student will be doing all the testing to the car that were chosen back in fall quarter. The student has completed all the tasks that were given and will be able to compete in the ASME RC Baja competition. The student completed three tests: suspension deflection, impact, and top speed. The first test the suspension deflected 12.5% less than the predicted 2 inches during the 1.5-foot drop test. The top speed achieved was 20 MPH and the deflection on impact was 10% more than predicted.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

R/C Baja: Drivetrain

Presented by: Connor Donovan, Project Mentor(s): Dr. Jeunghwan Choi, Charles Pringle

Abstract: The Central Washington University Mechanical Engineering Technology Department hosts an annual R/C Baja competition in which R/C cars fabricated by student teams are put through a series of courses and tests to determine which team's vehicle is best. The goal of this project was to create a functioning drivetrain that conveys power from the battery to the wheels and provides control of the vehicle. A list of requirements for the drivetrain was created to ensure that the vehicle will not only function, but that it will actually succeed in the competition. These requirements included that the vehicle must achieve a maximum speed that exceeds 20 mph and retain the capacity to produce maximum power for more than 15 minutes. To achieve this, preliminary calculations were completed that utilized principles from kinematics, basic electricity and mechanics of materials to ensure that these requirements would be met. Following this, 3D models and assemblies of the drivetrain and vehicle were produced. These steps culminated in the construction of the vehicle which utilized multiple construction methods such as machining and 3D printing. The finalized vehicle performed as intended with its maximum speed exceeding 25 mph and retained the capacity to produce maximum power in excess of 30 minutes.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

R/C Baja: Suspension & Chassis

Presented by: Caden Foster, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire
Abstract: Students designed and manufactured an RC Baja truck to compete as a team in the annual ASME RC Baja Competition in various events and obstacles. A chassis and suspension system were required to house and secure each of the RC components to successfully compete and function as intended. The team designed a 1/10th scale model RC truck through various analysis calculations and model mockup drawings to optimally perform and compete in a competition amongst other teams of designers. The American Society of Mechanical Engineers (ASME) competition will include the straight-line dash, slalom, and Baja course time trial. This project will dive into the specifics of the design process that went into the Chassis and Suspension portion of the overall manufacturing of the RC Baja truck. The design that was used is a unique half-plate design that incorporates long travel rear trailing arms that allow for a large range of motion to optimize traction at the driving wheels over rough terrain and jumps. 3D printing was used to create the trailing arms, front bumper, and front suspension components whereas the chassis plate, shock towers, and control arms were waterjet cut from aluminum. Tests included a force test which yielded a deflection in the control arm of 0.5 inches, an endurance test of 20-minute intervals of constant driving, a drop test that produced displacement in the shocks 0.25 inches greater than previously predicted, and finally a speed test that approximated the RC truck's terminal velocity of 20mph over a 30 yard distance.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

RC Baja: Drivetrain

Presented by: Rachel Krill, Project Mentor(s): Dr. Jeunghwan Choi, Charles Pringle
Abstract: Students and faculty of the mechanical engineering department of Central Washington University annually host an RC Baja challenge each spring, testing a RC car in three events: slalom, acceleration and Baja. The RC car that was tested in these events was designed, engineered and manufactured in teams of two teammates. The work was divided by choosing one teammate to work on the drivetrain and the other teammate to work on the chassis and steering. Twelve different analyses were performed to ensure the RC car was optimized and functional. These analyses used FBD's, statics, mechanics of materials and dynamics to ensure all the requirements specified for the RC vehicle were met. This included finding the top speed of the vehicle, the stress and component sizes and the loads/forces on designed mounts. Another important aspect analyzed was the torque transmitted from the motor, torque on the axle, and the total weight of the drivetrain. The drivetrain of the RC car was designed by Rachel Krill. All electronic drivetrain components have been assembled into the chassis, designed by Joe Fritz, and fit accordingly. Two mounts were 3D printed to hold the motor in place as well as to hold the center spool in place. The results included testing the speed which achieved the predicted top speed of 40MPH, the weight of 2 pounds for the drivetrain was achieved, as well as the volume being 300 x 220 x 300mm. Assembly and disassembly of drivetrain components was achieved in less than 3 minutes.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

RC Baja: Drivetrain and Steering

Presented by: Mathew Morgan, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire, Charles Pringle
Abstract: The RC Baja competition is a contest where undergraduate mechanical engineering students design, build, and compete against one another. The objective of this competition is to create the most efficient RC car possible. A gear train analysis was done and showed an 8:1 gear ratio would be the most efficient ratio due to the chosen motor having a higher torque output. Also, a stress analysis was done and showed that 2011 T3 aluminum passed the stress and weight criteria. These analyses ensured the RC Baja car was efficient. Most of the parts for the drivetrain and steering subassemblies were machined in the machine shop at CWU while some were 3D printed also at CWU. Once the RC car was designed and built, the efficiency of the RC Baja car is determined by doing numerous tests such as a speed test, drop test, cornering test, and a collision test. The speed test showed expected performance by averaging 20.5 MPH through the three trials over the span of 50 feet. The drop test from 1.5 feet was videoed to determine the deflection of the tie rods. The tie rods showed minimal deflection that was almost too small to measure at 0.01 in average over three trials. The cornering test was done three times to show an average of 5 degrees of yaw through a 60 corner over the span of three trials. This report will cover the designing, manufacturing, and testing of the RC Baja car that will be competed.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Team H & H RC Baja: Suspension & Chassis

Presented by: John Huff, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire
Abstract: An RC car needed to be created to meet set requirements to compete in the annual American Society of Mechanical Engineers RC Baja Competition. Students of the Mechanical Engineering Department of Central Washington University developed an RC car that has working suspension/ chassis size to hold a all components of a working RC car with a floating rear end. This RC car needed to meet set requirements to compete in the annual American Society of Mechanical Engineers RC Baja Competition. The requirements relative to the suspension/chassis is that the RC car must not exceed a weight of 10lb, must not exceed 500 dollars in cost, survive a 1.5ft drop landing flat, and withstand a 506.72N force on the front end during the impact test. To achieve these requirements the team completed material matrices, 24 analysis calculations, and worked together to create a device that achieved both partners parameters. The devices main assembly was broken into sub-assemblies that required parts to be machined using processes such as milling, drilling, and plasma cutting. The principal engineer and Bill Hedlund combined all completed sub-assemblies to finalize the RC Car. After completing construction, tests were completed to decide if the car was ready to compete in the event. After completing the tests, results showed that the car has not exceeded a 10lb max weight, the total cost of the project is 418 dollars, the car sustained the 1.5ft drop and impact of 506.72N tests without the suspension deflecting .5 inches.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Team H&H RC Baja Drivetrain

Presented by: William Hedlund, Project Mentor(s): Dr. Jeunghwan Choi, Chris Berkshire

Abstract: A need for a drivetrain and steering system that could provide locomotion and directional control for the H&H RC Baja racecar was needed. The RC Baja event is a competition hosted yearly by the CWU ASME club in which teams of engineering students compete against each other to test the effectiveness of the respective vehicle designs. The car needs to be able to compete in three events: a drag race, slalom course, and a Baja course event. This was accomplished by designing and manufacturing several parts from different materials utilizing a range of manufacturing techniques to produce sub-assemblies and that made up the drivetrain systems. The system was constructed using a variety of methods including; machining of parts, 3d printing, and off the shelf parts. The RC car was designed in SolidWorks a parametric modeling software to ensure manufactured parts were easy to assemble the systems was designed using; material analysis, statics, and concepts from mechanical design, across 12 unique engineering analysis to guide the engineering decisions and manufacturing processes and ensure the car would meet all requirements set forth by not drivetrain engineer but also the suspension and chassis engineer. The results of this work were a vehicle capable of a top speed of 25mph, climbing inclines up to 30 degrees and drivetrain assembly weighing less than 4 pounds.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Nutrition

Healthy Eating, Healthy You Education Workshop

Presented by: Natalie Seitz, Project Mentor(s): Susan Hawk, Tafere Belay, Kelly Pritchett

Abstract: With the rising rates of chronic disease and increase in western diet consumption, the introduction of nutrition education is essential for improving health outcomes. Given that poor diet is a modifiable risk factor for chronic disease, it is an area that should be targeted to improve health outcomes. The incidence and impact of conditions such as obesity, type 2 diabetes, cardiovascular disease and cancer can be reduced with nutrition education. Therefore, creating a supplemental nutrition education resource for adults was created to teach basic nutrition to help prevent disease and help guide them to healthy eating patterns that can help keep them healthy during a pandemic. For the project, nine nutrition-related topics were chosen for the curriculum. These topics include nutrient dense foods, fruit and vegetable intake, heart healthy foods, saturated fat, low fat dairy, gut health, fiber, and inflammatory diets. The completion of this project will enable educators to use the lesson plans to increase basic nutrition knowledge in adults. In turn, this would positively affect healthier lifestyle choices and physical changes. Future research is needed to evaluate the effectiveness of the project lesson plans on meeting learner outcomes.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Public Health

Creating a Longstanding Food Pantry Lead by Students of Color

Presented by: Megan Verrall, Jaeda Nelson, Bianca Sanchez, Andrea Guillen-Hernandez, Kenia Morales, Matthew Braganza, Project Mentor(s): Kate Doughty

Abstract: This poster presentation examines the ongoing efforts of PUSH, (President's United to Solve Hunger) an international initiative across university campuses that focuses on alleviating hunger on campus. The Central Washington chapter differs from other university campuses as it is student-led and student-initiated. Through examining PUSH's food justice initiatives such as the Wildcat Pantry, we can determine how our efforts have impacted the CWU community at large. With the new establishment of the Wildcat Pantry, a free food and supply resource, our team has faced several challenges such as consistent staffing, inventory maintenance, and social awareness.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Mixed Methods Exploration of COVID-19 Vaccination Status vs. Influenza Vaccine Uptake

Presented by: MacKenzie Carter, Project Mentor(s): Tishra Beeson, Amie Wojtyna, Katarina Mucha

Abstract: The COVID-19 pandemic and vaccines continue to raise vaccine-related concerns among adults in the United States and around the world. Vaccine hesitancy has increased in recent years, and prior to COVID-19, the majority of research on vaccine hesitancy in adults focused on beliefs, attitudes, and acceptance of annual influenza vaccinations. Fear of, and/or refusal to receive, an influenza vaccine has been more prevalent in certain segments of the population and across several demographic characteristics, even outside of the formal anti-vaccine groups. Individuals who have previously received an influenza vaccine as an adult are far more likely to receive future influenza vaccines. Many of the same indicators have been observed in those who have not received the COVID-19 vaccine, including people of color and those living in rural areas. I'll use a mixed methods approach to see if there's a link between COVID-19 vaccination status and typical influenza vaccine uptake in people aged 20 to 45 in a rural county. For the quantitative portion, I used data from the Kittitas County COVID-19 Vaccine Survey; preliminary results from a chi-square analysis showed that there is a statistically significant relationship between these two variables. Preliminary findings from interviews asking about typical influenza vaccine uptake corroborate these findings. These findings suggest that more targeted education and outreach for general vaccine-related concerns, as well as a better understanding of vaccine attitudes and beliefs, are warranted.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Self-Efficacy Among Yakima County Agricultural Workers During a COVID-19 Delta Variant Surge

Presented by: Hannah Lascano, Project Mentor(s): Amie Wojtyna, Casey Mace-Firebaugh, PhD, MPH, Tishra Beeson, DrPH, MPH, Dr. Kata Mucha, PhD, MPH.

Abstract: Yakima County is a rural county with an urban core located in central Washington State. With over 60% of its workforce dedicated to agriculture, food production, and other essential industries, the impact of the COVID-19 pandemic has been particularly compounded in Yakima County populations. According to the CDC, the risk of COVID-19 disease infection is much higher in agricultural farmworkers due to language barriers, inadequate healthcare access, lack of paid sick leave, cramped migrant housing and other sociodemographic issues. Accompanying factors such as low decision-making power, limited ability to social distance, and occupational limitations such as fear of job loss and non-compliance with immigration regulations have yet to be explored during the COVID-19 Delta variant (Delta) surge between September 2021 and November 2021. Self-efficacy refers to a person's confidence in their capacity to execute an individual behavior necessary to achieve a desired health outcome. This study aims to examine the self-efficacy to perform key COVID-19 prevention behaviors among agricultural farmworkers during the Delta surge in Yakima County. We will examine self-efficacy for COVID-19 disease protocols such as staying home when sick, hand hygiene and use of masks or face coverings. Self-efficacy was measured using several survey items related to respondents' self-reported confidence to be able to do the target prevention behaviors. Chi-square tests of proportions will be used to detect differences between the agricultural worker group and non-agricultural worker groups to examine how occupational status plays a role in individuals' ability to execute behaviors that may protect them under increased occupational risk of exposure.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Public Health; Women's, Gender and Sexuality Studies; Diversity & Equity Center- Student Success

Impact of THRIVE at a Predominantly White Institution: Building New Legacies & Reclaiming Space

Presented by: Jaeda Nelson, Project Mentor(s): Katrina Whitney, Janette Chien

Abstract: This poster presentation examines how ongoing Racial Affinity Groups (RAGs) for Women Students of Color (WSoC) in college and universities can impact students' sense of belonging at Predominantly White Institutions (PWI). Through examining THRIVE, women of color empowerment group run through the Diversity and Equity Center (DEC) at Central Washington University (CWU), we explore how RAGs impact students' support systems and capacity to navigate PWIs. We argue that RAGs contribute to the personal development of WSoC through an increased sense of belonging, community support, and empowerment in a PWI setting. Lastly, we conclude with recommendations for how PWIs could implement RAGs and other practices to support their students.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Sport Management

Joint NCAA Final Four 2027

Presented by: Brily Walker, Leah Ingold, Kevin Bodle, Mackenzie Lerman, Project Mentor(s): David Rolfe, Sean Dahlin

Abstract: The National Collegiate Athletic Association (NCAA) has been under scrutiny as of late when the differences between what was provided to the teams in the men's and women's Final Four of the NCAA Tournaments was made public knowledge. This is why, come 2027 the NCAA has decided to create a joint Final Four where all eight teams will stay at the same hotel in downtown Indianapolis and be provided with equivalent amenities. Our objective was to put together a cohesive action plan for how to navigate all the nuances that influence the biggest basketball tournaments in the country. We divided all amenities equally, including hotel rooms, locker rooms, practice facilities, gameday court times, and free time. We distributed the same options for food, travel, entertainment, and "swag bags" except for differing on toiletries provided. We also spent an equal amount of money on each tournament as they both combined into one, and we spent the same on advertising because every advertisement will be in reference to the unity of the joint tournament. This presentation is set to display how a joint NCAA Final Four Tournament would operate, how it would look, and what needs to change in terms of Title IX equality.

Presentation Type: SOURCE Oral Presentation (10mins, live-streamed and in-person/via zoom on May 18 & May 1

College of the Sciences

Departments of the College of the Sciences (COTS) at Central include:

- Anthropology
- Biological Sciences
- Chemistry
- Computer Science
- Geography
- Geological Sciences
- Law & Justice
- Mathematics
- Physics
- Political Science
- Psychology
- Science and Mathematics Education
- Sociology

In addition, the College of the Sciences (COTS) at Central includes the following programs:

- American Indian Studies
- Craft Brewing
- Cultural & Environmental Resource Management
- Environmental Studies
- Interdisciplinary Studies - Social Sciences
- Certificate in Science Dissemination
- Integrated Energy Management
- Primate Behavior & Ecology
- Science Talent Expansion Program
- Women's, Gender & Sexuality Studies
- Yearlong Exploration of Social Sciences

To learn more about COTS visit https://www.cwu.edu/sciences/

Panel: Anthropology & Museum Studies: Connect and Disconnect: Living Through Times of Social Disruption

Presented by: Nils Petersen, Makayla (Raelynne) Crow, Destanee Stillwaugh, Brittany Whiz, Brady Bell, Caleb Aal, Project Mentor(s): Lene Pedersen

Abstract: This panel presents perspectives on the theme of coping, specifically amid the challenges that intensified with the increased isolation during the COVID pandemic. Since the early months of 2020, large parts of the United States have come to brief and long-term pauses that have resulted in deep introspection and have led to abandoned paths and impulse decisions. With a reflexive approach, these vignettes capture elements of the internal and external barriers we all face and the process by which we try to overcome them. The creation of a painting while processing racial trauma; using self-tattooing to handle neurodivergence; a raw reflection on growth in motherhood; the pitfalls of isolation and how one might self-medicate; a retrospective on the life of Les Blank and his love of a life less ordinary; a search for collaboration after an impulse move to Brooklyn. The ethnographic collection pulls from disparate voices to offer a view of the human condition in myriad form. Each visual presentation is roughly 5-10 minutes and is a selection from Visual Anthropology, winter 2022.

Transcending Duality: Reconstituting a non-colonial tribal identity.

Presented by Makayla (Raelynne) Crow. Step-by-step, the artist shares her process of creating a painting that's a dynamic representation of her indigenous identity in dissonance with colonial frameworks.

Tattoos Hurt Less.

Presented by Destanee Stillwaugh. A visual follow and interview of a non-binary person who uses self-tattooing as a coping mechanism for various mental health disorders.

Motherhood.

Presented by Brittany Whiz. A reflection on the birth and growth of a student-mother in a time of global pandemic and social ideology of intensive mothering.

Have You Eaten Today?

Presented by Brady Bell. A capture of life during the COVID era and quarantine, highlighting difficult subjects such as depression, loneliness, and alcoholism -- and a life-thread.

A Les Blank Retrospective.

Presented by Caleb Aal. Les Blank's films have in common a romantic outlook, celebrating expressions of a joy of living. Always For Pleasure provides a recipe to follow for the enjoyment of red beans and rice.

Anomie or Affinity.

Presented by Nils Petersen. A brief Exploration in Isolation and Collaboration. An experimental look at loneliness and its effect on creativity in NYC, one of the most densely populated cities in the world.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Anthropology & Museum Studies

Activity Area Analysis for the Sanders Site (45KT315)

Presented by: Emily LaPlante, Project Mentor(s): Steven Hackenberger
Abstract: The Sanders Site (45KT315) was excavated in the 1970s by Central Washington University. The site is located on the Yakima Army Training Center some 12 kilometers up Johnson Canyon from the Columbia River. The site was occupied from as early as 9,000 years ago; however, the heaviest occupations with features and activity areas date closer to 3000 years ago which are associated with Frenchman Springs Phase. We are interested in how food processing and animal use at this seasonal upland site compares to sites on the river that may have been occupied year-round.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: C. Farrell Fine Arts & Research Scholarship

Bishop Spring, the Zooarchaeology and Geoarchaeology of an Early Holocene Deposit, Quincy, WA

Presented by: Corwin Brewer, Izzabella Perini, Project Mentor(s): Steven Hackenberger
Abstract: Bishop Springs was trenched in the early 1970's to increase water flow for livestock. Saturated sediments, with fragmented bone and stone tools, are two to three meters deep. Climate models suggest the spring was active during the early Holocene, but that current conditions are determined by active recharge from irrigation run off. The geological and archaeological potential of the site have been summarized in a PhD dissertation and a MS thesis. Analysis of samples of faunal remains have been completed as part of one professional study and one student project. This presentation updates the identification and taphonomic analysis of the animal remans. We characterize the fragmentation and condition of bone and reevaluate the size class of animals based on small fragments of large elements of bone (limbs and vertebrae). Unburned bone samples have been tested and do not contain sufficient collagen for radiocarbon dating. New radiocarbon dates for burned bone suggest that some of the sample is 12,000 year old. A pilot study of the magnetic susceptibility (MS) of sediment and bone from the site sample supports interpretation of site formation and the relative age of the unburned bone sample. We compare MS measurements for: 1) sediment samples by levels/strata, 2) sediments adhering to bone, and 3) bone with red, green and black staining. Our study helps to establish the significance of the site and needs to both investigate the deeper portions of the site and protect the site setting.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Ethical Curation of Human Skeletal Remains at CWU

Presented by: Kiley Radovich, Project Mentor(s): Nicole Jastremski

Abstract: At Central Washington University, the Anthropology and Museum Studies Department is in possession of a number of commingled human skeletal remains from an unknown number of individuals, and stored in the Forensics Lab for teaching purposes. Recently, controversy has arisen over the ethics of keeping human remains at academic institutions. The aim of this study was to catalog and analyze the remains at CWU, for the purposes of knowledge and safekeeping in an ethical manner. This involves composing a biological profile of said remains, including sexing, aging, ancestry, and stature of bones when applicable. A thorough inventory, measurement, labelling, and a rating of completeness with accordance with standard protocols, was also conducted. It is important to remember that at the forefront of this research that these bones belonged to a once living person, and therefore need to be treated with respect and dignity. The goal of this research is to handle these remains with care, and establish an ethical curation of said remains, so future academics may continue to learn from them while maintaining the dignity they deserve. This is important since these remains are handled on a weekly basis by students who are just beginning their academic careers. Establishing an ethical curation of this human skeletal remain collection is vital for the continued future use of this collection for educational and research purposes.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Greenwood Cemetery: History, Mapping and Ground Radar

Presented by: Jamie Mickus, Natasha Lipsky Project Mentor(s): Steve Hackenberger

Abstract: We are investigating the history of the Greenwood Cemetery, mapping graves, and conducting ground penetrating radar surveys (GPR). The cemetery, near South Cle Elum, was an active burial place from 1903 until 1923 when it was abandoned due to flooding. Some bodies were relocated to the new cemetery which is the Laurel Hill Memorial Park. The graveyard is now officially under the care of the City of Cle Elum and is maintained with the help of the Roslyn Ronald Cle Elum Heritage Club. We are mapping marked and unmarked grave features and trying to distinguish between graves with remains and graves without remains. A photographic record of features and markers has been compiled. Graves will be matched using burial records by name as possible. Several survey grids (20x20 meters) are placed around graves located in clusters between large trees. GPR transect lines are collected for each grid using a pulse EKKO Pro “Smartcart” with 500 MHz transducers. Radar images of features are represented in profile and slice views. Using the data and images we can predict whether burials may be intact or removed. We are working with the Roslyn Heritage Club, collecting oral history, and will be using genealogy to locate decedents. We are presenting in local high schools and inviting students to dive headfirst into history, archaeology, and careers. Our project is supported by the CWU Dr. Corrine Farrell Merit Scholarship Program.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: C. Farrell Fine Arts & Research Scholarship

Preliminary Analysis of Fauna from 1950s Excavations at a Coastal Site in Willapa Bay, Washington

Presented by: Kevin Menzia, Project Mentor(s): Patrick Lubinski

Abstract: About 1957, former CWU professor James Alexander excavated at a coastal site in Willapa Bay he labeled 45PC21, which may actually be 45PC7, the Martin Site. If it is the Martin site, later work by Shaw in 1974 yielded radiocarbon dates 1400-1900 years old for this site thought to be ancestral Chinookan. Alexander's excavations consisted of two 3 x 5-foot units dug 7 to 9 feet deep, and probably not screened. No detailed analysis was performed, but Alexander's 1957 report notes recovery of 24 stone tools, some 240 bones, shell, fire-cracked rock, charcoal, and wood. In 2022, I analyzed the 137 extant bone specimens from Test Pit 2. These include a wide variety of animals, including sea mammals (harbor seal, sea otter, porpoise or dolphin, larger whale), terrestrial mammals (elk, deer), and bird. Nearly all the remains are broken, and most could be identified only to general animal size, dominated by Size Class 6 (about the size of an elk and sea lion or 200-1500 lbs.). Fourteen bones have evidence of butchering in the form of cutmarks, three show impact notches, and three were further modified into artifacts. The artifacts are all uncertain function, and some are the remains of artifact manufacture rather than the finished objects themselves. The most interesting are two distal cannonbones (one elk and one deer) sawed off using the groove-and-snap technique at the lower shaft, presumably to create thick bone tubes from the shafts (not present).

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Anthropology & Museum Studies; Cultural & Environmental Resource Management

Connections Across the Land in the Kittitas Valley: Geographic Plotting of Material Diversity at the Grissom Site (45KT301)

Presented by: Nik Simurdak, Maria Kovach, Kiley Radovich, Lauren Otto, Jeremy Cobb, Kevin Menzia, Project Mentor(s): Patrick McCutcheon

Abstract: The Grissom archaeological site (45KT301) in the Kittitas Valley has a continuous occupational history spanning the last 2,000 years. The Grissom collection contains tens of thousands of artifacts housed in over 60 boxes, with materials ranging from precontact lithics to historic-era trade goods like seed, glass, and shell beads. Potentially part of the ethnographically described trade hub Che-lo-han, the Grissom collection demonstrates a confluence of materials from across a large geographic region. Located on Yakama traditional territory ceded in the Treaty of 1855, the Grissom site reflects a long history of movement through the Kittitas Valley and across the Columbia Plateau. This poster maps and explores a sample of that diversity, demonstrating the geographic connections of the Grissom site around the world through the examination of a few selected objects. By providing historical and cultural context for these objects, we can illuminate the complex history of Indigenous presence in the Kittitas Valley, movement of Indigenous peoples across the Pacific Northwest, and Euro-American colonization.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Controlled Chaos: Organizing and Working with Extant Archaeological Collections

Presented by: Nik Simurdak, Maria Kovach, Kiley Radovich, Lauren Otto, Jeremy Cobb, Kevin Menzia,
Project Mentor(s): Patrick McCutcheon

Abstract: Excavated more than 50 years ago, the Grissom site (45KT301) has yielded a collection of tens of thousands of artifacts housed in 60 archival boxes. Pieced together across several field seasons by dozens of students, the Grissom collection contains many uncertainties. Though many of these were addressed through a rehabilitation of the collection in the mid-2000s and a thesis exploring the history of the investigation, students wishing to complete research on this collection still face a variety of unique challenges, including unclear labels, misfiled artifacts, and compounding transcription errors. Through the work of six students totaling over 300 hours of lab time, many of these issues were identified, articulated, and addressed. This poster summarizes some of the specific concerns one might face when conducting research on collections such as Grissom and discusses how problems were anticipated and addressed, where errors occurred, and how to better prevent such mistakes in the future. The practices discussed here will be useful to any researcher tackling a collection of a similar scale and history and provide a better understanding of how to make the most of a collection and protect it for future use.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Applied Mathematics

Analysis of Overdose Deaths

Presented by: Nathanael Delarosa, Project Mentor(s): Brandy Wiegers

Abstract: We will be using a variety of interpolation functions in order to analyze the illicit drug overdose deaths in the last 20 years. We will construct a program to approximate the change, rate of change, and total change of drug-related deaths. The data set used was the 1999-2020 CDC drug-related deaths. We will be looking for trends and sudden behavior changes in order to see how policies and world events affect the death rate.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Analyzing Air Quality Trends in Bishkek

Presented by: Josh Johnson, Project Mentor(s): Brandy Wiegers

Abstract: In the small post-Soviet country of Kyrgyzstan, nestled in the Tien Shan mountains, lies the city of Bishkek. Due in part to it's geographic location, and in part to the poor urban planning of the city, Bishkek struggles with some of the worst air quality problems in the world. We will be looking into some data about the air quality in Bishkek, and we hope to gain some insight into this problem.

We will be using various numerical methods, to try to predict trends about how air quality behaves in Bishkek. The methods used will take existing data about air quality and then use mathematical methods about how the air quality is behaving to see if we can figure anything out about our data set. The goal of this project is to implement Mathematical methods onto an existing data set, and try to predict how air quality will behave in the future.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Analyzing Consumer Price Index Over Time in the Seattle-Tacoma-Bellevue Area

Presented by: Nickolis Haviland, Project Mentor(s): Brandy Wiegers

Abstract: The Consumer Price Index (CPI) has been a measure of inflation dating back to the early 20th century; consisting of a variety of goods that the typical house in the United States would purchase, it has been steadily increasing up until present day. For this, the data, sourced from the U.S. Bureau of Labor Statistics, covers the value of the Consumer Price Index over time in the Seattle area, specifically Seattle-Tacoma-Bellevue area. Various forms of numerical analysis were applied to this data, including the use of Taylor polynomials, numerical differentiation, and Lagrange interpolation. Using numerical differentiation, the rate of change of the tabular data was estimated over time. With this, the two forms of interpolation, Taylor polynomials and Lagrange polynomials, were applied to the data in order to evaluate important points in the set as well as project future values of the CPI. In order to get an understanding of the accuracy of these models, evaluations of the absolute error and the error bound were done for both forms of interpolation in regards to the data set. In addition, error between the numerical differentiation of the data set and the numerical differentiation of the Lagrange polynomial was done, in order to gain further insight into the accuracy of the models.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Analyzing Home Prices in Washington State

Presented by: Abby Tallman, Project Mentor(s): Dr. Brandy Wiegers

Abstract: Home prices are constantly fluctuating and in recent years the median price for a home in Washington state hit an all-time high. The goal of this project is to understand the housing market's trends using data from the Office of Financial Management for Washington state (OFM). The data is the yearly median home price (measured in US dollars) in Washington state from 2000 to 2020. Using this data we will create an approximation that lines up with the data and makes a reasonable prediction for the median housing price next year. To accomplish this goal we will construct several interpolating polynomials and compare their results. We will also examine how the housing market has changed from 2000 to 2020. To accomplish this goal we will conduct numerical differentiation methods and numerical integration methods.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Conducting Numerical Analysis of Mt. Baker Snowfall Data

Presented by: Cameron Bundy, Project Mentor(s): Brandy Wiegers

Abstract: Since the mid 19th century, the scientific study of climate change has been a growing global issue. An area of study related to climate change is the fluctuations in snowfall levels at ski resorts. Over the last decade almost all ski resorts in Washington state began using snow machines, which are used to create snow, to help sustain business during periods of low snowfall in the winter season. The only Washington State resort not using snow machines is Mt. Baker Ski Area. This research examines the yearly total snowfall of Mt. Baker ski area over the past 50 years. This analysis is conducted using interpolation techniques and numerical differentiation. The goals of this study is to try and forecast future snow levels at Mt. Baker ski area.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Global Temperature Anomalies

Presented by: Nolan Dahlman, Project Mentor(s): Brandy Wiegers

Abstract: Climate change is a term that is always talked about amongst scientists. A genuine concern for the planet we live on is understandable. One of the most talked about terms in the climate change conversation is global temperature. Modern technology allows us to sample temperature with ease. We are now able to obtain past years temperatures in tree rings and ice cores. Averaged over the sample locations for each time period, we have an average global temperature for each year. A temperature anomaly is a drastic difference in temperature based on the average global temperature. As complex creatures we are extremely sensitive to temperature change. So in this data set we will look to predict the greatest temperature anomalies based on previous temperature data. If we can see whether there is a trend in the temperature anomalies, this may help us convince the masses that climate change is happening now.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Predictive Modeling for Buying and Selling Bitcoin

Presented by: Andrew Struthers, Evan Nordin, Project Mentor(s): Brandy Wiegers

Abstract: The stock market is frequently targeted by mathematicians and non-mathematicians alike. Most people's goal in life is to make a bunch of money, and the stock market provides that glimmer of hope a lot of us need. In this project, I will be attempting to model then S&P 500, one of the most famous indexes on the stock market. The S&P 500 is a portfolio of the top 500 performing companies on the publicly traded market, tied into one index. I will be taking a sample of the price of the S&P 500 once every hour, each hour, for the duration of an arbitrary day, then attempt to fit various interpolating curves to this data in an attempt to predict the next hour's price. The mathematical methods I will use will form different interpolating polynomials that I can then take and plug back in an arbitrary time value. The value of the interpolating polynomials at this arbitrary time value will represent the estimated price of the S&P 500 based off of the previously captured data. From there, I will be able to write code that automatically buys and sells shares of the index and uses these predictions to maximize the value of my trades.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Sentiment analysis and social media: quantifying the impact of the 2016 presidential election

Presented by: Zach Ohara, Project Mentor(s): Brandy Wiegers

Abstract: Sentiment analysis, also known as opinion mining, is an application of natural language processing (NLP) in computer science that aims to identify positive or negative sentiments expressed in human languages. Sentiment analysis systems are given an excerpt of human-written text and are able to classify the author's sentiment as positive, negative, or neutral. As a repository for vast amounts of user-generated content, social media websites are naturally of great interest in sentiment analysis research, and many papers have been written on the topic. In this project, we use sentiment analysis tools to determine overall user sentiment in comments on Reddit's r/politics board, a forum for discussion of American politics, posted between the creation of the board in October 2007 and the most recent data in December 2021. We then use a variety of numerical and statistical methods to examine potential trends in overall user sentiment and explore the effect of recent election cycles on the sentiment of online political conversation, with a particular focus on the the short- and long- term effects of the 2016 presidential election.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Super Bowl Popularity Estimated Using Taylor, Legrange, Hermite, and Cubic Spline Approximations

Presented by: Evan Swearingen, Project Mentor(s): Brandy Wiegers
Abstract: The Super Bowl is the annual playoff championship game for American Football of the National Football League, or NFL. The Super Bowl has served as the last game in every NFL season since 1966. Viewership and ratings have been recorded for each Super Bowl since the Super Bowl II in 1967. Taking viewership to represent the popularity of the event, we create high-order polynomials using various methods to further understand Super Bowl popularity. Taylor's theorem is used alongside Lagrange polynomials, Hermite polynomials, and cubic splines to predict popularity of the Super Bowl between when the event is annually held. Additionally, numerical differentiation methods are used to further understand how the rate of change of the popularity of the Super Bowl changes over time. This is done in part to understand how streaming and the COVID-19 pandemic has potentially affected viewership.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Using Numerical Analysis to Explore Ovarian Cancer

Presented by: Cleta Malwitz, Project Mentor(s): Brandy Wiegers
Abstract: Cancer is a disease where abnormal cells in the body grow at an uncontrollable rate [1]. One form of cancer that only affects women is ovarian cancer. Ovarian cancer originates in the ovaries or related areas such as the fallopian tubes or peritoneum [1]. Similar to many other types of cancer the deadliness of ovarian cancer is determined by the stage at which it is found along with how the patient responds to treatment. Ovarian cancer has been a subject of research for the the International Agency for Research on Cancer website which is part of the World Health Organization. There are many different datasets on this website but the one of interest for my project looked at how the age-standardized mortality rate per 100,000 women between the ages of 20 to 59 between the year 1979 to 2017. Using numerous interpolation methods the original dataset was examined in order to find the best approximation of the original dataset. Furthermore, this project aims to use the best approximation to understand how the age-standardized mortality rate has behaved of the years and what that means concerning the deadliness of ovarian cancer.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

What happens when Tires Retire?

Presented by: Timothy Eberl, Project Mentor(s): Brandy Wiegers
Abstract: Tires are a serious waste management concern. Landfills prefer to not deal with them due to their bulky nature and are a major pollution source if dumped illegally. It is common for measures to be put in place to have tires recycled, reused or burned for fuel. The Washington State Department of Ecology has tracked each of these disposal methods from 2005 to 2017 to examine how effectively they are diverted into more suitable chains. We are primarily concerned with the total tons of tires disposed of each year and will use mathematical analytical techniques to predict future trends.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Applied Mathematics;Biological Sciences;Economics;Mathematics;

Exploring Optimal Lockdown Policies During the COVID-19 Pandemic

Presented by: Cameron Bundy, Project Mentor(s): Sooie-Hoe Loke
Abstract: COVID-19 has impacted public and economic health worldwide. To bolster the economy and maintain human life, economic and epidemiological research is vital. Nations have implemented lockdowns intent on slowing the spread of the virus. This research examines how lockdown parameter adjustments can help control a nations fatalities. The study incorporated an SIRD disease model that is simulated over a 365 day period. The goal of the research is to take the SIRD model and incorporate further parameters to simulate a lockdown. Being able to observe the outcome of the model simulation may provide insight to the importance of lockdown intensity for the future. I hope to use this model to create a minimization function that analyzes dynamics that best produce minimal loss of GDP as well as low loss of life in a lockdown.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: McNair Program

Biological Sciences

Bicyclic Lactams have leishmanicidal activity against Leishmania major, the agent of Human Cutaneous Leishmaniasis

Presented by: Hunter Korf, Project Mentor(s): Blaise Dondji
Abstract: Leishmaniasis is an infectious disease caused by the parasitic protozoan Leishmania. Present in 88 countries, with 350 million people at risk and roughly 12 million patients, Leishmaniasis is endemic in tropical and Mediterranean areas where the female sandfly vector thrives. There are three clinical manifestations of the disease: cutaneous, mucocutaneous, and visceral leishmaniasis, also referred to as Kala-Azar. Leishmania major, the focus of this drug discovery project, manifests in humans as cutaneous leishmaniasis, a disease characteristic of its skin lesions. Amphotericin B (Amp B) is the only FDA approved treatment for leishmaniasis in the US, but is toxic to patients. Consequently, there is an urgent need for new compounds that are active against Leishmania, non-toxic or less toxic, and affordable. In my contribution to this ongoing drug discovery project, I worked to identify organic compounds that are active against Leishmania parasites. To evaluate the anti-Leishmanial activities of bicyclic lactam compounds, I preformed in vitro assays using the dye Alamar Blue to indicate cell viability. Amp B and dimethyl sulfoxide served as experimental controls. At a concentration of 100 µg/mL, eighty-four total compounds were screened. Twelve compounds were identified to have leishmanicidal activity, with an additional eight compounds that were semi-active. By performing dilution curve analyses, I found that the lowest concentration at which compounds were still active was 25 µg/mL. Using flow cytometry, the candidate compounds were analyzed against mammalian splenocytes to indicate cytotoxicity. A dual-parameter stain for apoptosis and necrosis was performed, however, preliminary findings on cytotoxicity were inconclusive.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Evaluating variation in Clark's Nutcracker (Nucifraga columbiana) relative diet using feather stable isotopes

Presented by: Jasmine Ruiz, Project Mentor(s): Alison Scoville

Abstract: The Clark's Nutcracker is a bird with a mutualistic relationship with whitebark pine (Pinus albicaulis), a keystone tree species currently threatened by mountain pine beetles, climate change, altered fire regimes, and white pine blister rust. White pine blister rust is an invasive fungus introduced in the 1910s which attacks five-needled white pine species, including whitebark pine. Previous research indicates the nutcracker relationship with whitebark pine may be detrimentally impacted by the invasive fungus. However, no previous research has been able to compare diets before and after the introduction of blister rust. Using feather stable isotopes from museum specimens, I analyzed dietary information to address shifts in relative diet over seasons, life stages, habitats, and over the last 128 years. Shifts between seasons within each of these years showed significant increases in trophic level during the summer and decreases in trophic level during the spring and fall seasons. Adults also appeared to utilize conifer seeds more often than juveniles, even during the summer season. Over the years, there is evidence of diet shifts that may indicate a change conifer species preference, yet no significant changes in their relative trophic level. My project relates to whitebark pine conservation through examination of nutcracker diet shifts based on impacts of fire exclusion, climate change, and invasive species over the years and the seasonal stability of nutcracker-conifer relationships.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: Washington State Distinguished Fellowship in Biology.

The effect of the microbiome on the productivity of wheat in response to stress

Presented by: Rowan Thomas, Project Mentor(s): Mary Poulson

Abstract: Washington grows and harvests nearly 200 million bushels of wheat a year. Climate change is causing drought and abiotic stresses affecting farmers and wheat crop yields. The goal of my research is to determine whether the application of bacterial inoculants can enhance the tolerance of wheat to environmental stress

Three environmental stress conditions and a control were tested: drought, cold, and high salinity. In each of these conditions, plants were treated with a commercial soil inoculant that has B. subtilus, B. amyloliquefaciens, B. megaterium plus some mycorrhizae fungi. The commercial inoculant was mixed with water to make a type of "tea". The "tea" was added to the soil for some plants and used to treat the seeds (but not soil) for some plants. Other plants had no microbe treatment. After the plants had grown with or without the microbe treatment their leaf area, root mass, aboveground mass, stomatal conductance, and photosynthetic rates were measured.

Results indicate that wheat plants treated with the commercial bacterial inoculant prepared as a "tea" that was added to soil had 2-3 times higher total fresh weight and 5-6 times total leaf area as compared to plants grown without bacteria or with bacteria added as a dry soil amendment.

The wheat industry is important in Washington as the climate and landscape change environmental stresses that lower plant productivity. Microbes that promote plant growth will be important to add to the soils to combat environmental stresses.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: Shirley Joan Cook Undergraduate Research Award

Biological Sciences; Biomedical Science Specialization; Chemistry

Evaluation of antileishmanial activity of synthetized thiazolidinone compounds

Presented by: Kiera Bush, Project Mentor(s): Blaise Dondji, Gabrielle Stryker, Timothy Beng

Abstract: The leishmaniases are a group of vector-borne parasitic diseases that affect many third world countries including parts of Africa, India, and the Middle East in addition to Southern Europe. It is estimated that worldwide, there are about 3 million new cases of leishmaniases each year leading to as many as 50,000 fatalities annually. There are three clinical forms of the infection: visceral, which is fatal if left untreated and can cause enlargement of spleen and liver; cutaneous, which causes skin lesions and ulcers; and mucocutaneous which destroys the mucus membranes of the nose and/or mouth. The parasite that causes leishmaniasis belongs to the genus Leishmania spp and is transmitted by the female phlebotomine sand fly. The current drugs used to treat leishmaniasis are very toxic with sometime life-threatening side effects. It is therefore urgent to identify new therapeutics with less or no toxicity. In order to contribute to this goal, we will be screening synthetized thiazolidinone compounds for activity against Leishmania spp. A colorimetric assay with Alamar Blue reagent will be utilized to assess the viability of the parasites. We will also screen the compounds for toxicity to mammalian cell using flow cytometry to estimate the proportions of apoptotic and necrotic cells. We hope that at the end of our project to find less toxic and antileishmanial compounds.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Biological Sciences;Ecology and Evolutionary Biology Specialization

Analysis on the construction of wildlife crossing structures on I-90

Presented by: Cade Walker, Project Mentor(s): Alison Scoville

Abstract: Roads have allowed for increased connectivity between humans, but also fragment animal habitats and impede movement. When animals do move across roads, wildlife-vehicle collisions (WVCs) can occur, which endanger people, are costly, and cause unnecessary mortality in wildlife populations. Reducing wildlife collisions protects biodiversity while also protecting people. Construction of wildlife crossing structures on I-90, which started in 2008, has aimed to reduce wildlife collisions for those reasons. The Washington Department of Transportation (WSDOT) has collected data on the number of WVCs occurring on I-90 in the construction area, as well as a control area, from August 2008 to the present. In addition, wildlife cameras have been deployed to document the usage of wildlife crossing structures both before and after their construction. Based on those data, I used generalized linear mixed-models to analyze the effect of construction on both wildlife-vehicle collisions and movement of wildlife across the highway. Construction of the wildlife crossing structures has resulted in safe passage across the I-90 freeway thousands of times, for species ranging from ungulates such as elk and deer to carnivores such as coyotes,' preventing wildlife collisions from occurring. Increased time since construction is associated with an increase in the number of crossing events, especially for deer and elk within the Price/Noble Creek area overcrossing. Implementation of these wildlife crossing structures on I-90 has allowed for connectivity between habitats while decreasing the number of wildlife-vehicle collisions as animals can now safely cross the barrier created by the I-90 freeway.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Analyzing the relative density of Whitebark pine cones in the cascade mountains

Presented by: Seth Valenzuela, Dominic Singh, Project Mentor(s): Alison Scoville

Abstract: Our study pertains to the mutualistic relationship between endangered whitebark pine (WBP) and its sole mechanism of seed dispersal, the Clark's nutcracker. This obligate mutualism is essential for reproduction of WBP, which relies on Clark's nutcrackers to break their cones open and introduce the seeds to a new location. Nutcrackers carry as many as 100 seeds at a time in a sublingual pouch in order to cache them just below the soil surface at thousands of different locations and at distances of up to 20 miles away from the original tree. WBP populations are currently endangered due to the combined effects of climate change, introduced blister rust (a fungal pathogen), altered fire regimes, and attack by mountain pine beetles. Decline in WBP populations may alter or endanger their mutualistic relationship with Clark's nutcrackers and may be monitored through estimating cone densities of WBP trees. Our research focuses on quantifying relative densities of cones in WBP and Ponderosa pine stands through analysis of 2021 data collected using three different methods: distance transects, distance point counts, and simple belt transects. This analysis will provide useful insight into the efficacy of these methods in providing reliable data for future cone counts (depending on how close the estimated values are across counting methods) and will be used analyze the effect of WBP cone density on the incidence of Clark's nutcracker visitation at different locations.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: Funding from Central OUR Grants

Biological Sciences; Exercise Science

Biological Processes Associated with Up-Regulated Genes in Aging Human Skeletal Muscle

Presented by: Jonathan Dickinson, Project Mentor(s): Jared Dickinson

Abstract: The precise molecular factors that contribute to declines in skeletal muscle size and function with advancing age are not completely understood. PURPOSE: To identify biological processes associated with upregulated genes in aging human skeletal muscle. METHODS: Skeletal muscle biopsy samples (vastus lateralis) were analyzed from healthy younger (27±3yr; 8M, 1F; BMI: 24.5±2.0) and older adults (68±5yr; 6M, 3F; BMI: 25.9±4.7 kg•m-2). Muscle biopsies were obtained after an overnight fast under resting conditions controlling for previous physical activity. Total RNA was isolated and whole transcriptome next-generation sequencing (HISeq2500, Illumina) was performed on cDNA. Differential gene expression between young and old was identified using DESeq2 (with young as reference). Genes with an adjusted p-value of <0.1 were considered differentially expressed. RESULTS: Of the 20,810 genes that were identified, 1,515 genes were considered to be differentially expressed in older adults compared to young. Here, we focus on the biological processes associated with 729 genes that were found to be upregulated in the skeletal muscle of older adults compared to young. We found 102 biological processes were associated with the genes found to be upregulated in the skeletal muscle of older adults. Many of the biological processes were linked with skeletal muscle contraction and cell differentiation. CONCLUSION: These data highlight biological processes that may be linked to age-related changes in skeletal muscle. Further research is needed to identify to what extent these unique biological processes may provide insight toward therapeutic targets for aging skeletal muscle.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Biological Sciences; Physics

Biophysics of filament organization in the nervous system

Presented by: Roy Cruz, Project Mentor(s): Erin Craig

Abstract: Microtubules (MTs) are a type of polymer filament that makes up the cytoskeleton of a cell. The cytoskeleton is a structure that maintains the cell shape and more. Proteins called molecular motors transport organelles along microtubules. Microtubules also maintain the structure of axons and dendrites in the nervous system. The organization of MTs into a specific pattern (process called polarity sorting) is essential for axons to function properly. Disruption of MT polarity can affect the distribution of organelles and lead to neuron degeneration. The objective of this project is to test how MT organization is impacted by a class of proteins in the axon called crosslinker proteins, which link two MTs together and do not affect their directional mobility through the axon. We are using a computational model that simulates the MT organization in the axon. The model simulates MT movement in response to forces from molecular motors, with tunable parameters that take into account the orientation of MTs, MT length, and protein attachment numbers. We analyze plots of simulated data to determine how the overall polarity is changing with respect to the changes in the contributions of each crosslinker protein type. We use this approach to investigate which crosslinkers are a significant advantage for polarity sorting of axonal MTs. This study will help address the importance of MT polarity corruption, which is a probable contributor to neuronal degeneration during disease and injury. Further study could foster strategies to overcome disease-related corruption of MT polarity patterns and correct the flaws.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Biology Teaching; Chemistry Teaching; Educational Foundations & Curriculum; Elementary Education; English and Language Arts Teaching; Middle Level Science Teaching; Science Education; World Education

An Exploration of Science Education Around the World

Presented by: Tricia Daly, Project Mentor(s): Allyson Rogan-Klyve

Abstract: I am a science teacher who is interested in teaching overseas. I was curious about how science is taught pre-university in different countries. I conducted a pilot study using an online survey that I created in a secure software program. This survey was emailed to people I knew with contacts in other countries who then could pass it on to their networks. The idea was to gather as many responses as possible from as many different people outside the United States. I received 29 responses from places such as India, China, and Nigeria. My survey was designed to gather qualitative data and the question responses have been classified into similar groups. My questions focused on the style of education systems, such as if there was a standard vocational program, what science topics were taught at which grade levels, and which scientists were covered. This was a pilot study, to see what could be learned about a topic that was difficult to research. One conclusion was that there are many ways to modify the survey to focus on different aspects, and that this could benefit from further research. There are no international standards of education, nor is there a simple way to find out what is taught in other countries. This can make it difficult for teachers who might wish to emigrate or join a volunteer organization to teach overseas. An international database of standards, perhaps hosted by the United Nations, would be very useful in a modern, interconnected world.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Biomedical Science Specialization; Biological Sciences; Biochemistry

Excess Sugar Alone Induces Fatty Liver in HEPG2 Hepatocytes

Presented by: Jennifer Lewis, Project Mentor(s): Sarah Oppelt

Abstract: Liver disease affects one in every three Americans and leads to diseases such as Type II Diabetes Mellitus, hypertension, and cardiac disease. The majority of people suffering from liver disease did not abuse alcohol but rather develop fatty liver from diets high in simple sugars or sugar and fat together. These metabolically stressful diets induce steatosis and fibrosis, which is referred to as Non-Alcoholic Fatty Liver Disease (NAFLD). In this study, we used HEPG2 cells as a model for fatty liver disease caused by excess sugar, without excess fat. To look at how excess lipid accumulation impacts HEPG2 cell metabolism, we induced lipid droplet formation by feeding cells media containing different concentrations of hexoses and growth factors. rates of cells cultured in low (5mM) or high (25mM) glucose or high (25mM) fructose were measured with Crystal Violet assays. Growth rates between different groups were not significant; excess sugars did not promote faster growth, nor did it cause cell death. Oil Red O staining was used to assess intracellular lipid accumulation in excess glucose and excess fructose (with 5mM glucose), with or without growth factors. Growth factors are needed to induce lipid-laden cells; high sugar concentrations in the media alone are not sufficient. Excess lipid droplets are known to cause metabolic stress by disrupting the reduction-oxidation balance of a cell. To assess this, glutathione levels were measured. We show that excess sugars, without fat, can promote fatty liver in HEPG2 cells.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: Funding from Central OUR Grants

Chemistry

Effects of Chemical Exposure on Hepatocyte Mitochondrial Networks and Cell Viability

Presented by: Bethany Eaton, Project Mentor(s): Carin Thomas

Abstract: Mitochondria are organelles that have become more widely studied. Even though they produce energy through cellular respiration and improve cell function, they are also associated with numerous disease states. It is hypothesized that reactive oxygen species (ROS) induce oxidative stress which can thereby alter the shape of mitochondria and their critical role in cell viability. This study compares chemical exposure of menadione, an ROS producer, and phthalates (plasticizers) on mouse hepatocyte cells to determine their effects on mitochondrial shape and cell viability. Three experiments were performed to analyze the effects of chemical exposure: 1) WST-8 cell viability assays, 2) Cell ROX Green ROS evaluations, and 3) Fluorescence microscopy. Taken together, we found that increased ROS production from low concentrations of chemical exposure has a positive effect resulting in connected mitochondrial networks and high cell survival. However, higher ROS production, due to higher chemical concentrations, resulted in a variety of fragmented mitochondria shapes associated with dysfunction and increased cell death. The results of chemical exposure with phthalates were not similar to exposure with menadione. Instead, this chemical exposure showed lower ROS production, less variety in mitochondrial shape, and a more modest increase in cell death. Therefore, we conclude that ROS mediated the mitochondrial morphology changes associated with decreased cell viability.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: Graduate Student Research Support and Summer Fellowship;

Mixed-Monolayer Gold Nanoparticle Interactions with Bovine Serum Albumin

Presented by: Jennifer Hanigan-Diebel, Project Mentor(s): Samuel Lohse

Abstract: Engineered nanoparticles (ENPs) have become common in industry and commercial products and have in recent years gained further attention for their possible diagnostic and therapeutic applications in biomedicine. These applications necessitate a thorough understanding of the behavior and interactions of ENPs in vivo. It is known that nanoparticles, when they enter the bloodstream, associate with serum proteins to varying degrees, resulting in different outcomes. These associations are driven by the characteristics of the nanoparticles including size, core composition, and surface chemistry. In this study, gold nanoparticles (AuNPs) of 5 nm diameter were synthesized with monolayers composed of a negatively-charged ligand (mercaptohexanoic acid, (MHA)), a neutral ligand (mercaptoethoxyethoxy ethanol (MEEE)), or a mixture of the two ligands, and used to investigate interactions with bovine serum albumin (BSA). Fluorescence titrations were conducted to determine binding affinity and it was found that the binding constants (Ka) for MHA, MEEE, and mixed-ligand AuNPs were 0.47 ± 0.02 nM-1, 0.40 ± 0.02 nM-1, and 0.48 ± 0.02 nM-1, respectively, indicating that the affinity of BSA for both MHA-capped and mixed-ligand AuNPs is higher than that for MEEE-capped AuNPs. The difference between MHA and MEEE-capped and between mixed-ligand and MEEE-capped AuNPs was statistically significant, whereas the difference between the mixed-ligand and MHA-capped AuNPs was not. Fluorescence studies were also used to determine the Hill coefficient n for the binding of BSA with each AuNP type. In all cases n was greater than 1, indicating cooperative binding of BSA molecules to the AuNP surface.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: Ivory Nelson Graduate Fellowship

Selective Oxidation of Disulfide-Embedded Cyclic

Presented by: Mckenna Sax, Project Mentor(s): Timothy Beng

Abstract: Organic compounds that contain sulfur (i.e., organosulfur compounds) are associated with rich flavors. Meanwhile, ~80% of small-molecule drugs contain a nitrogen atom and ~67% are found within a heterocycle. Specifically, N,S-heterocycles such as 4-thiazolidinones exhibit a diverse range of biological activities, including antifungal, antioxidant, cytotoxic, anti-inflammatory, anticonvulsant, anti-HIV, antitubercular, and many others. Organosulfur compounds are also present in several medicines, fragrances, and materials. A cost-effective and environmentally friendly method for the controlled synthesis of two types of organosulfur compounds; namely sulfoxides (one with two carbon-sulfur bonds and one sulfur-oxygen bond) and sulfones (one with two carbon-sulfur bonds and two sulfur-oxygen bonds) has been developed. The outcomes are achieved through controlled oxidation of cyclic compounds bearing a disulfide bridge (R-S-S-R) as well as a protein-type bond (referred to herein as disulfide-embedded lactams). The cost was controlled by using a cheap and commercially available catalyst known as N-fluorobenzenesulfonimide (NFSI). Water served as the solvent and the oxygen source for the controlled oxidation. Since water is a green and an environmentally friendly solvent, the successful execution of the proposed strategy has set the stage for the attainment of the highly coveted green chemistry status. A structure-activity relationship (SAR) study is being performed together with another group member and Dr. Dondji in the Department of Biological Sciences, with a focus on neglected tropical diseases, especially leishmaniasis.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: Funding from Central OUR Grants

Stereocontrolled Synthesis and Evaluation of Platelet Aggregation Inhibitory Activity of Highly Decorated Lactam Carboxamides

Presented by: Jayme Zesiger, Jane Eichwald, Jolyn Fessenden, Kaiden Quigley, Project Mentor(s): Timothy Beng

Abstract: The most common causes of mortality worldwide are currently heart attacks and strokes. They result from significant clotting of blood in the arteries. This is commonly referred to as arterial thrombosis. The search for more selective antithrombotic agents therefore represents an important research objective. One lactam carboxamide (a cyclic amide that bears a noncyclic amide functional group) has recently been found to exhibit remarkable efficacy in reducing arterial thrombosis in mouse models. It outperformed the standard drug, aspirin. In these studies, a diverse library of lactam carboxamides has been assembled in a cost-effective, atom-economical, and orientation-specific manner by utilizing green chemistry. This method used to create the library is modular, chemoselective, and diastereoselective. This provides an excellent opportunity for further therapeutic applications. The structures of the synthesized carboxamides have been confirmed by routine spectroscopic techniques, including nuclear magnetic resonance spectrometry (NMR). In house collaborators are evaluating the blood clotting inhibitor activity of these versatile compounds. The in vitro anti-platelet efficacy will be investigated in platelet-rich plasma, induced by collagen. A detailed structure-activity relationship study is ongoing in hopes of finding the best agent in preventing arterial thrombosis.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: Funding from Central OUR Grants;Funding from Central Faculty-Student Provost Research Grants

Chemistry; Biomedical Science Specialization

Discovery of Novel Boronates; Structural Building Blocks of Potential Enzyme Inhibitors

Presented by: Jacob Olson, Kaitlyn Ditter, Tyler Pratt, Hannah Reynolds, Project Mentor(s): Levente Fabry-Asztalos

Abstract: As bacteria and viruses continue to mutate and develop multidrug resistance, the urgency for developing more effective treatments increases. While this increase in mutation can be somewhat mitigated by the modification of current medicinal treatments, more long-term solutions involve the use of more novel remedies. Past investigations with the use of boron-containing compounds have shown significant potential as potent therapeutic compounds. Currently, there are five boron-containing FDA-approved medications. This supports the potential effectiveness of boron-containing chemical compounds and it indicates the need for more in-depth research, discovery, and development. Currently, the Fabry research group focuses its efforts on the synthesis of boron-modified inhibitors of HIV-1 aspartic protease. This work involves a homologation reaction followed by a nucleophilic bimolecular substitution. The obtained novel boronates are characterized using nuclear magnetic resonance (NMR) spectroscopy and gas chromatography/mass spectrometry (GC/MS). The ultimate goal of this project is to create a diverse library of novel boron compounds and to test the limits of synthetic boron chemistry.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).
This work is supported by: Funding from Central OUR Grants

Computer Science

Anti-eBay

Presented by: Adara Andonie, Nick Fechtel, Alex Worland, Project Mentor(s): Szilard Vajda

Abstract: Online retail is quickly becoming just as popular as shopping in person. Many platforms such as Amazon and eBay allow buyers to find and purchase what they need. However, these platforms cater to the benefit of the seller by setting a price for their product, while buyers come to them for a purchase. Our team has created a piece of software called "Anti-eBay," which caters to the needs of the buyers rather than those of the seller. With our system, buyers can post a product they are looking for and the sellers will seek out buyers that are willing to buy their product. The sellers will then bid for the buyers' purchase.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Computational Analysis of Breathing Rates for Distracted Drivers

Presented by: Adara Andonie, Project Mentor(s): Joe Lemley, Razvan Andonie.

Abstract: Distracted driving is a major cause of accidents. Adding different stress factors to driving can not only distract from the road but can also affect the body's response to stress. To see how distracted driving affects the body, an experiment was conducted where subjects were asked to drive in a simulator while also being asked to perform various tasks. We want to see how breathing rate changes during different stages of the acquisition and how this change in breathing rate may differ between participants. Some of the tasks included in the data acquisition were playing white noise, playing a BBC clip, asking questions, asking subjects to look at their phone, and to drive with no distractions. All subjects had sensors on them which allowed for the gathering of data. The data from acquisitions was then processed and an algorithm was created that can determine breathing rate. Graphs of the breathing rates were plotted for the subjects to see the change of breathing rate throughout all acquisitions. Comparing the data from the graphs of all subjects against each other, we are starting to see some patterns in the breathing rates of phases across all the subjects. By analyzing and observing patterns in the breathing rates, we can see how the breathing changes when subjects are under various stress. The project will continue to further develop the approach and incorporate other modalities and life metrics such as heart rate.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

EnRoute - EV Charging Station Locator

Presented by: Richard DeYoung, Kirsten Boyles, Lucas Keizur, Project Mentor(s): Szilard Vajda
Abstract: As gasoline is an unsustainable resource, the push to transition to electric cars has steadily increased. As a result, the infrastructure to support these types of vehicles has also improved, and several businesses have come into the field to fulfill this need. As Tesla was one of the first in the field, they have their own plugs and their own charging stations and a hassle-free payment system. However, Tesla is not the only company in either the EV producing and charger producing field. Ford, Hyundai, Nissan, and most other car companies have started their own line of EV's and they all have the same standard charging plug (different from Tesla's) and also have different brands, prices, and no centralized way to find these charging stations, check prices, and pay for them. This issue was brought to the CWU Computer Science Department by Envorso, a consulting firm. To solve the issue of non-Tesla owners having a poor experience when charging, a cross–platform account federation Android mobile application was developed using the Flutter framework and the Google Maps API, as well as various other APIs for solving small tasks. User data and charger station data was stored on an external database. The app allows users to create an account, search for chargers nearby and within a given city, filter chargers by speed or price, navigate to chargers, and save their favorite chargers. The infrastructure for the federation of charging service accounts was created and is currently in an early testing stage. If the project is to be continued on by the client, the federation system will be fully implemented, the database will expand to more locations within Washington, and the app will have an iOS release.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Interpretable Machine Learning for Self-Service High-Risk Decision-Making

Presented by: Charles Recaido, Project Mentor(s): Boris Kovalerchuk
Abstract: Abstract—This presentation contributes to interpretable machine learning via visual knowledge discovery in general line coordinates (GLC). The concepts of hyperblocks as interpretable dataset units and general line coordinates are combined to create a visual self-service machine learning model. The DSC1 and DSC2 lossless multidimensional coordinate systems are proposed. DSC1 and DSC2 can map multiple dataset attributes to a single two-dimensional (X, Y) Cartesian plane using a graph construction algorithm. The hyperblock analysis was used to determine visually appealing dataset attribute orders and to reduce line occlusion. It is shown that hyperblocks can generalize decision tree rules and a series of DSC1 or DSC2 plots can visualize a decision tree. The DSC1 and DSC2 plots were tested on benchmark datasets from the UCI ML repository. They allowed for visual classification of data. Additionally, areas of hyperblock impurity were discovered and used to establish dataset splits that highlight the upper estimate of worst-case model accuracy to guide model selection for high-risk decision-making. Major benefits of DSC1 and DSC2 is their highly interpretable nature. They allow domain experts to control or establish new machine learning models through visual pattern discovery.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Visualization of Decision Trees based on General Line Coordinates to Support Explainable Models

Presented by: Alex Worland, Project Mentor(s): Boris Kovalerchuk

Abstract: Visualization of Machine Learning (ML) models is an important part of the ML process to enhance the interpretability and prediction accuracy of the ML models. This paper proposes a new method SPC-DT to visualize the Decision Tree (DT) as interpretable models. These methods use a version of General Line Coordinates called Shifted Paired Coordinates (SPC). In SPC, each n-D point is visualized in a set of shifted pairs of 2-D Cartesian coordinates as a directed graph. The new method expands and complements the capabilities of existing methods, to visualize DT models. It shows: (1) relations between attributes, (2) individual cases relative to the DT structure, (3) data flow in the DT, (4) how tight each split is to thresholds in the DT nodes, and (5) the density of cases in parts of the n-D space. This information is important for domain experts for evaluating and improving the DT models, including avoiding overgeneralization and overfitting of models, along with their performance. The benefits of the methods are demonstrated in the case studies, using three real datasets.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: United States Department of Defense

Computer Science; Cybersecurity Specialization

Protego: A Python Package for SQL Injection Detection

Presented by: Bradley Reeves, Project Mentor(s): Razvan Andonie

Abstract: Malicious software, or malware, has quickly become a top threat among companies and government agencies. It has the potential to expose sensitive information, halt business operations, and even cause a catastrophic loss of life. Malware can be deployed in many ways including hardware injection (USB), software injection, and misconfiguration. Software injection continues to be a popular attack vector and consistently ranks within the top three web application security risks published by OWASP. One of the simplest types of software injection is called SQL injection. This attack takes advantage of the fact that most applications interact with a database. Engineers can reduce the risk of successful attacks by following secure development practices, but cannot eliminate them. Prōtegō is an easy-to-use Python package that can be leveraged to identify and deter SQL injection attacks. It uses the most current machine learning algorithms to identify attacks with high accuracy.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Cultural & Environmental Resource Management

Historic Climate Change, Climate Variability, and Streamflow Trends in Kittitas and King Counties

Presented by: Megan Cline, Project Mentor(s): Megan Walsh, Mike Pease

Abstract: Anthropogenic climate change is projected to increase throughout the 21st century. These increases will impact communities around the globe, so determining potential rates of temperature and precipitation change in these areas is an important task. However, most climate change studies are done at global/regional levels rather than county/municipality levels. This can create issues in areas like the Pacific Northwest, which has a high amount of topographic and climate variability within the region. For example, it is unclear how shifting snowfall trends in much of the Cascade Range will impact snowpack losses, streamflow, and water availability in local communities. This research examines historic direction and rates of climate change in Kittitas and King counties, Washington. Historic climate data has been gathered from five climate stations, two in each county and one on Stampede Pass, for the past 120 years. An analysis and visualization of these data, combined with historic streamflow data, are making it possible to evaluate county-level temperature and precipitation trends and assess their impact on current and future water availability in these counties. Preliminary results comparing climate normals at each of the climate stations show changes in average monthly maximum temperature of anywhere from -2.1 to 3.5°F, with the most drastic changes occurring at Stampede Pass. These results will be compared with wider PNW and global climate trends, both past and projected, to determine patterns in climate variability at different spatial scales.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Environmental Geosciences; Geological Sciences

A Geochemical Study of the Teanaway River and its Tributaries, Central Washington

Presented by: Megan Jackson, Project Mentor(s): Carey Gazis

Abstract: This geochemical study examines the Teanaway River and its tributaries over a 6-month period from May 2021 to November 2021. The Teanaway River, located near Cle Elum, WA, is one of the Yakima River's largest tributaries and lies within the Columbia River Basin. The Teanaway River is a critical resource for the local community and has recently been targeted for habitat and stream restoration through the formation of the Teanaway Community Forest. The goal of this study is to characterize the natural variations in stream water chemistry based on major element composition and stable isotope. These methods allow for the assessment of weathering reactions in tributary watersheds and how they alter the chemistry of river water, as well as the determination of mixing relationships between snowmelt and different surface waters. Three forks of the Teanaway (North, Middle, and West) were reviewed in this study as well as five smaller tributaries. Thus far, we have observed that the West and Middle Forks are similar both isotopically and in terms of major elements compared to the North Fork. These differences can be explained by differences in east-west position and geology of the subbasins drained. The West and Middle Forks drainages are further west accounting for the heavier isotope signatures. The North Fork drainage includes the ultramafic Ingalls Complex which might account for the higher Mg concentrations in its waters. Seasonal variations in water chemistry reveal higher concentrations in August and September when streamflow is dominated by baseflow and snowmelt contribution is minimal.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: WASER Grant

Panel: Environmental Studies Community Partner (Ellensburg High School)

Reecer Creek Insects

Presented by: Kelly Duong, Willow Logan, Himiko Amos, Instructor: Jeff Hashimoto, Mentor: Jason Irwin
Abstract: We measured insect species diversity within different sub-ecosystems of the Reecer Creek Floodplain Restoration Project, Ellensburg, WA. We hope to understand how diversity changes throughout the seasons in three areas: river, ground, and trees. We captured insects using sweep nets at 3 different plots for each area in Fall 2021 and Spring 2022. We found that the river area (Shannon Index 1.47) had higher species diversity compared to the ground (Shannon Index 1.33) and trees (Shannon Index 1.04). Out of the three areas, Chironomidae were the most common insect, most likely due to their ability to live in diverse habitats. Aphidoidea and Araneae were also extremely common. Extending insect population studies to other seasons will yield a more complete understanding of insect diversity at Reecer Creek.

Composition of Creek Sediment Through Farmland - Kittitas County

Presented by: Wyatt Mullings,Ca therine Bell, Holly Fromherz, Instructor: Jeff Hashimoto, Mentor: Carey Gazis
Abstract: We measured the elemental composition of sediment at the heads compared to the mouths of six different streams in Kittitas County, Washington. Sediment composition can determine the effects of large-scale agricultural fertilization and the health of stream ecosystems as they flow through farmland. We collected two sediment samples from each of the six creeks we selected in Kittitas County, and determined the elemental composition of the samples. We analyzed the samples using Central Washington University's ICP-OES which provided results in which most streams had high amounts of specific elements, including: aluminum, calcium, iron, and potassium. Our measurements showed the opposite of our hypothesis; streams contain higher concentrations of elements at the tops of creeks versus the bottoms, with a few exceptions that may have resulted from errors in the procedure. Further research could be conducted to determine why higher concentrations of elements are found at the tops of creeks, and whether this is the case in other counties as well.

Stream Velocity and Flow Categorization in Restored Reecer Creek

Presented by: Lucy Altman-Coe, Reagan Messne, Bella Estey, Instructor: Jeff Hashimoto
Abstract: The velocity of water in a stream affects vegetative growth, nutrient dispersal, temperature, as well as rearing habitat and spawning areas for salmon and steelhead. We measured stream velocities and depth at 20 locations along a 1.8 km section of the Reecer Creek Floodplain Restoration Project, Ellensburg, WA. We compared our data to fall of 2014. We found that the stream velocities in fall of 2021 had a lower average velocity (0.527m/s < 0.748m/s) and lower standard deviation [0.259m/s < 0.362m/s]. For the 2014 data set 27% of data points were outside of one standard deviation compared to 40% of our data points more than one standard deviation away. From this, we were able to conclude that the restoration was successful in creating a variable stream habitat that is favorable to a healthy salmon and steelhead population.

Reecer Creek Cross Sections

Presented by: Carol Ritzenthaler, Ashley Callan, Lydia Blaisdell, Nathaniel Arango, Brandin Miller,
Instructor: Jeff Hashimoto

Abstract: We measured cross sections of Reecer Creek at three locations in the Reecer Creek Floodplain Restoration Project in Ellensburg, WA. The significance of this project is to fully understand the natural dimensions of Reecer Creek, and identify channel stability, the channel migration zone, and channel beds. Ongoing variations in water flow in the Reecer Creek flood plain have led to corresponding variations in the topography of the river bed, due to both deposition of organic material, and erosion due to water flow. We took depth measurements of the river bed every quarter-meter to create a graphable cross-section of three different locations along Reecer Creek. We compared our data to two cross sections taken since 2011. We found a reduction of depth indicating a pattern of deposition, raising the height of the river bed across most points of observation. We conclude that two of the cross-sections were narrower and one was morphed into a wetland adjacent to the main channel. This is most likely the result of the floodplain added in 2011 to stop flooding within the housing community surrounding the area. This changed the ecosystem and environment within the streams dramatically and may continue to change in upcoming years.

Reecer Creek Photo Documentation

Presented by: Daniel Quinn, Chase Perez, Instructor: Jeff Hashimoto

Abstract: We started this project by asking the question of "How has Reecer Creek changed over time?". We decided to answer this question through Photo Documentation. Our experiment was part of our high school class's experiments to determine exactly how the Reecer Creek Floodplain Restoration Project, Ellensburg, WA has succeeded or failed to prompt ecological recovery through the years. We built our conclusions off of previous data from the same experiment, completed in 2011 and 2016 by our previous classmates in years beforehand. We went into the experiment looking for differences in vegetation, water levels, and creek water flow. To collect our data, we used gps pinpoints and previous data to find picture locations and capture new images. We used the same locations and procedure as previous groups to achieve the closest comparisons. After data was collected, we overlaid previous images on new pictures as close as possible to better see key differences between past and present. From our analysis, we determined that there were significant changes in vegetation area, wetland development, and introduced plant growth. Our results demonstrate the success of the Reecer Creek Floodplain Restoration Project in achieving regrowth and land reclamation. Besides our data, we also used assumptions based on the inaccessibility of certain areas due to plant growth to make these conclusions. These findings confirm the conclusions of our seniors who performed this experiment previously, who also found that plant growth in Reecer Creek is thriving after a secondary succession event. This experiment is repeatable and can be conducted in the future in order to determine further changes in the floodplain.

Reecer Creek Aquatic Plants

Presented by: Dylan Alm, Thomasa Tate, Instructor: Jeff Hashimoto

Abstract: We surveyed aquatic plants at 3 locations in the stream on the Reecer Creek Floodplain Restoration Project, Ellensburg, Washington. We compared native and invasive species of flora in and around the area. We measured 1m2 areas at stratified random locations in Reecer creek. We counted the number of each species of plant in each area. We concluded that there are more native than invasive flora at Reecer Creek. For example, our upstream section contained 60% Widgeon Grass (native), 30% Clasping-Leaf Pondweed (native), and 10% Reed Canary Grass (Invasive). We recommend continued monitoring of Reed Canary Grass, which is a highly invasive species that is known to outcompete native flora. In every section of the creek this grass was present, and in our opinion this is a threat to Reecer creek and its native flora.

Environmental Studies; Environmental Geosciences; Geological Sciences

Comparison of Lichen Growth Between Basalt Boulders and Talus

Presented by: Alicia McAfee, Fernanda Alvarez, Jordan Echaniz, Erin McConnachie, Project Mentor(s): Lisa Ely

Abstract: Multiple species of lichen occupy different environments at Frenchman Coulee near Quincy Washington. Lichen is a composite organism arising from symbiotic relationship between an alga and fungus. The purpose of our research was to determine whether lichen was more abundant on talus slopes or boulders. The boulders are large, immobile rocks on the valley floor, while the talus is smaller, loose basalt rocks on the hillslope. We hypothesized that there would be a greater percent coverage of lichen on the boulders than the talus. The boulders are not easily moved, possibly providing the lichen a greater chance to grow undisturbed, while the talus is made up of smaller rocks that might be more easily disturbed. During two trips to Frenchman Coulee on February 21 and 27, 2022, we placed 1-meter square quadrat frames against the west-facing side of basalt boulders and the slopes of the adjacent talus. We measured 40 replicas, 20 of the talus and 20 of the adjacent boulders. Photographs of each plot were analyzed with computer software that placed gridlines over the photos. Each intersection of lines that contacted lichen was counted to calculate the percent coverage of lichen in each quadrat. We found that there was no significant difference between the amount of lichen on the boulders compared with the talus. The results indicate that either the more frequent movement of the talus does not impact the lichens' ability to grow on the rock, or the talus is more stable than we initially proposed.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Environmental Studies; Film and Video Studies

Cli-Fi Films: The Day After Tomorrow (2004) and Wall-E (2008)

Presented by: Heidi Flores-Montiel, Project Mentor(s): Pamela McMullin-Messier

Abstract: This research project aims to identify how effective Climate fiction (Cli-fi) films are for influencing public perception of climate change issues. Cli-fi films first emerged in the 1990s and quickly grew in popularity as they were well received by diverse audiences. These films typically are used to inform people about the possible consequences of climate change in order to invoke a call to action. The Day After Tomorrow (2004) and WALL-E (2008) are used as examples of Cli-fi films that target different audiences and they will be analyzed in the context of public perception for the climate issues portrayed. Data from surveys will be collected and analyzed to compare how Cli-fi films affect public perception. Surveys will be distributed to CWU students and students will be asked about their experiences with Cli-fi films as well as whether their perception of climate change issues have been impacted by watching Cli-fi films, such as The Day After Tomorrow (2004) and WALL-E (2008). The results of this study will be used to identify the effectiveness of Cli-fi films on shifting public perception on climate change issues as well as the influence on audiences towards behavioral change and social action.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Environmental Studies; Resource Management; Geography; Cultural & Environmental Resource Management

Wilderness & the Geotag: Exploring the Relationship between Georeferenced Social Media Data and Recreational Visitation in the Alpine Lakes Wilderness, WA

Presented by: Mara Gans, Project Mentor(s): Jennifer Lipton, Sterling Quinn, Carla Jellum
Abstract: Many have raised concerns about the impact of geotagged social media images on public lands. They claim that geotags increase recreational visitation which subsequently contributes to negative recreational impacts including crowding, trampled vegetation, erosion, and litter. Others, however, claim that geotagging on social media has made the outdoors more accessible to less privileged communities and raise concerns that restricting geotags will perpetuate the exclusion of certain groups from nature. This debate is particularly relevant to federally designated wilderness. Wilderness is legally defined as "untrammeled by man," and this problematic construction has helped justify indigenous land dispossession and restricted access for other marginalized populations in wilderness areas. This paper will present the results of research that explores the relationship between geotags, visitation, and the perception of recreational impacts within the Alpine Lakes Wilderness in Washington. It uses a GIS kernel density analysis to determine which locations are most frequently geotagged on Flickr and Instagram and then surveys visitors at these sites to ascertain if geotags played a role in individuals' decisions to visit. It also explores whether recreational impacts negatively affect visitor experience at these sites and explores visitors' expectations for wilderness. The findings of this study suggest that social media does play a role in some visitors travel decisions, however few visitors consider geotags specifically when making their decisions. Furthermore, this research suggests that, despite individuals' concerns that geotags are "ruining nature," the majority of visitors' expectations are still being met within frequently geotagged sites in the Alpine Lakes Wilderness.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)
This work is supported by: Funding from Central Faculty-Student Provost Research Grants

Environmental Studies; Sustainability

Development of a Sustainability Literacy and Behaviors Survey

Presented by: Alicia McAfee, Project Mentor(s): Susan Kaspari, Kathleen Klaniecki
Abstract: CWU is working to improve its sustainability. As part of this effort, through CWU's Sustainability Certificate I developed a sustainability literacy and behavior survey that tests students' knowledge about sustainability topics and challenges, and also assesses students' sustainability behaviors. This survey will help CWU assess and evaluate their sustainability education initiatives and see what can be improved upon. This survey will also gain CWU points through the Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainable Tracking, Assessment and Rating System (STARS). This survey is to be taken as a pre and post survey, one at the beginning and one at the end of a period of time. Then when analyzing the results, we can see what students learned about sustainability in a certain course and how we can improve education about the topic. The survey was given out spring and fall of 2021 as a trial run and to receive feedback about the survey. The survey was revised, and re-administered in the winter and spring of 2022. Here are the results of the survey, including results from the survey administered at the beginning and end of a course to assess gains in sustainability literacy by the students.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Geography

Central Washington University Commuter Analysis: Employees

Presented by: Eileen Kelsey, Project Mentor(s): Sterling Quinn

Abstract: To lessen their environmental impact, universities across the United States started taking a closer look at their own carbon footprint. At Central Washington University, the sustainability department is seeking to accomplish a part of this goal by cutting down on greenhouse gasses emitted by employee commuters. The necessary first step in solving this problem is using GIS to determine where the commuters are located and how many miles they are commuting per day. By using a 60-mile study area, split into 6 zones, I found that most employees are located within 0-2 miles accounting for nearly 3000 miles commuted each day. However, while only 10.1% of commuters are located in rural and outlying cities, they account for 19,812 miles commuted per day. Our results also showed us more comprehensive employee and student data, including telework information, should be collected before an action plan to reduce GHG emissions can be solidified.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Late Holocene Fire History Reconstruction from Beaver Lake in the Northwest Lowlands of The Olympic Peninsula

Presented by: Grace McKenney, Project Mentor(s): Megan Walsh

Abstract: Fire is an important component of the landscapes and forests of the PNW, including the temperate rainforests of the Olympic Peninsula in northwest corner of Washington State. Previous studies in other areas of the peninsula show that past fire activity has varied locally and regionally as a result of changes in vegetation, climate, and human-land use activities since the early Holocene. The reconstruction of a late Holocene fire history record from the Beaver Lake watershed will provide a high resolution record in the currently understudied northwest section of the peninsula. This study uses macroscopic charcoal analysis of a 6.17 meter-long lake sediment core to illustrate how fire activity has varied at the site during the past 3400 years. The results of this study will be compared to local and regional records of changing vegetation, climate, and human-land use activities to provide a more complete understanding of the environmental history of the Olympic Peninsula during the late Holocene. Preliminary results show that fire has been present at Beaver Lake for at least the past 500 years in varying amounts, and continued research on the sediment core aims to pinpoint more specific shifts in fire activity. Land managers, archaeologists, and other researchers can use this data to better understand human-environment interactions in the case of fire on the peninsula.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Lexical data analysis of popular hiking areas in the Alpine Lakes Wilderness

Presented by: Eileen Kelsey, Project Mentor(s): Jenifer Lipton

Abstract: During the COVID19 pandemic public lands felt a massive surge in visitation with people looking for alternative socially-distanced activities. As land managers scrambled to keep up with maintaining these spaces, there was a demand for more efficient ways of understanding problems and making decisions. One solution to this problem is the implementation of spatial data analytics, which can help prioritize department resources to areas of concern. Lexical data provided by recreationalists can efficiently provide valuable information about visitation through use of data analytics software.To demonstrate the value of spatial data analytics in land management, I will be working with lexical survey data from the most well-traveled hiking areas of Alpine Lakes Wilderness. I will identify key words and shared themes of both positive and negative sentiment. By integrating the data with geographical locations I will show areas and features needing special attention.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: Funding from Central OUR Grants

Spatial Trends of Multi-Home Ownership in College-Towns versus Non-College Towns

Presented by: Connor Hayes, Project Mentor(s): John Bowen

Abstract: College towns are often defined by their unique reliance economically on the presence of a college or university, with higher education providing much of the employment and fostering a large renter market. And, in recent years, housing costs have risen rapidly, including in college towns. One thought on this phenomena is the consolidation of houses into the control of fewer and fewer hands. Thus, this project concerned itself with the spatial patterns of multiple home ownership (MHO) in college towns and non-college towns. Data was collected for Ellensburg and Cheney in the former category, and Everett, Sunnyside, and Wenatchee in the latter. County parcel data was acquired and processed through ArcGIS Pro and Excel to identify parcels owned by individuals or entities that own multiple parcels in the same community. These patterns were then used to calculate MHO percentages for number of parcels, acreage, and value of parcels. Wenatchee proved to be an outlier with a high level of MHO in neighborhoods outside the urban core. However, the two college towns had a greater concentration of MHO in their core than the other towns, and had high concentrations even in outer areas. This could be one of the reasons why the housing market is rising at a rapid rate.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Geological Sciences

Developing and Validating a Standard Operating Procedure for Quantitative Analysis using Central Washington University's X-ray Diffractometer

Presented by: Katherine Lucas, Project Mentor(s): Chris Mattinson, Angela Halfpenny

Abstract: X-ray diffraction (XRD) is widely applied in a variety of disciplines to identify the different materials present in a powdered sample. Recent software advances allow the use of XRD data analysis to quantify the amount of each material in a sample, but the quality of the result depends on the sample preparation and data collection procedure. I am developing standard operating procedures for sample preparation, data collection, and analysis to achieve optimized results for quantitative XRD analysis of geological samples at CWU. First, I determined that the grinding time necessary to powder 10 g of different mineral samples, at a frequency of 30 Hz, varies considerably depending on mineral type. Biotite and muscovite took the shortest time (35 minutes), while the plagioclase minerals took the longest (at least 70 minutes). Next, I tested the effect of measurement time on data quality, and found that the smaller XRD peaks become more pronounced with increasing measurement time, especially with a duration of 1 hour or more. I performed preliminary quantitative analysis on the mineral samples. Sample purity ranged from 75-99%; I selected samples with more than 90% purity to be used in further tests. Future work will involve using synthetic rock mixtures to determine the accuracy, precision, and detection limits of the XRD's software by comparing my XRD quantitative analysis results to the known composition of the mixtures. I will then determine the measurement duration necessary to collect publishable results for quantitative analysis, and write standard operating procedures for other users.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: Funding from Central OUR Grants, William O. Douglas Honors College (DHC)

Gold Mineralization in Liberty, Washington

Presented by: Timothy Miller, Project Mentor(s): Angela Halfpenny

Abstract: The chemistry and crystallography of gold can be used to interpret its provenance and genesis. This research will focus upon understanding the fundamental processes that control the concentration, deposition and growth of gold in the Liberty area, Washington. The area presents a unique field site for studying the controls on gold mineralization, preservation, and weathering, as it displays a variety of gold textures including nuggets, placer grains, wire gold and crystalline lode gold. This research will work on the 20-acre Gold Reserve (GR) mining claim located directly south-east of the Liberty townsite. Areas that contain gold will be identified using a metal detector and detailed mapping performed to record the mineralization structures, local faulting, contacts and other geological features. A non-destructive, Bruker Tracer 5i, portable X-ray fluorescence spectrometer (pXRF) will be used to measure the elemental signature to identify areas containing gold within quartz/carbonate mineralization of the GR claim for sampling. It is unclear how much of the placer gold found in the Liberty area is sourced from the local primary crystalline gold found in hard rock mineralization. A comparison between the two can be made by using scanning electron microscopy (SEM) to characterize the chemistry and crystallography, to determine if the placer deposits could have been sourced from the local in-situ gold. The results will improve our understanding of the paragenesis and overall evolution of the gold within the Liberty area. This knowledge can be applied to other key commodities required to support our global society.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: Funding from Central Faculty-Student Provost Research Grants; CWU Graduate Student Research/Creative Activity Support Award

Paleoseismic investigation of rupture in the northeastern Kittitas Valley, Washington

Presented by: Garet Huddleston, Project Mentor(s): Walter Szeliga

Abstract: Geologically based age constraints of past ruptures on active faults provide key inputs for seismic hazard assessment. In the Kittitas Valley (KV) of central Washington, a northwest trending fault scarp with ~1 m of relief, recently detected using Light Detection and Ranging (LiDAR) mapping, suggests that relatively recent earthquakes have occurred along the associated fault. The fault is likely an extension of the Dead Coyote Fault (DCF), an active fault that forms escarpments in Quaternary units across the northern KV. No large historical earthquakes (M>5) have been recorded in the KV. Additionally, there are no paleoseismological estimates for the timing of the most recent earthquakes on local faults, their recurrence, or their potential magnitude. Although the KV is a rural region with low population density, it is within 100 miles of the larger cities of Yakima and Wenatchee, the Hanford Nuclear Site, and multiple irrigation diversion and hydroelectric dams which could experience significant shaking in the event of a large-magnitude earthquake in the KV. Our investigation will trench across the fault scarp to investigate its paleoseismology and determine the age, magnitude, and recurrence of past earthquakes along the fault to aid in the regional seismic hazard analysis. This process includes topographic analysis and collecting ground penetrating radar (GPR) data to provide the ideal location for a trench, and then excavation will allow for detailed geologic mapping of subsurface layers, creating a high resolution photomosaic and collecting samples for radiocarbon or optically stimulated luminescence (OSL) dating.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: Funding from Central Faculty-Student Provost Research Grant

Quantifying the Perception of News Articles on Tide Gauge data related to the Tohoku Tsunami

Presented by: Luke Michel, Project Mentor(s): Walter Szeliga

Abstract: The 2011 Tohoku tsunami is one of the instrumentally most well recorded tsunami in the past century. Additionally, rapid global communication of the tsunami's impending arrival at far-field locations allowed for not only mitigation of hazard, but broad human observation of the incoming wave-train. We seek to combine these unique data sets by analyzing tide gauge records of the 2011 Tohoku tsunami with far-field observations obtained from local media outlets to quantify the effect of tsunami wave height on human perceptibility. Our goal is to provide a bridge between quantitative tsunami model output and qualitative tsunami observation that will help to inform hazard mitigation for tsunami in the far-field. Our results could be combined with future numerical tsunami modeling to provide a sense of a tsunami's hazard to locations in the far-field or, additionally, these results could be combined with historical reports of far-field tsunami inundation to help provide constraints on tsunami wave amplitude from historical tsunami events.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: McNair Program

Geological Sciences; Biological Sciences

Mima Mounds, Crust & Fire

Presented by: Abbey Crowe, Philip Siguenza, Anthony Smith, Project Mentor(s): Lisa Ely

Abstract: In September 2020 the Evans Canyon Fire partially burned areas on Umtanum ridge south of Ellensburg, Washington. In the burn area are mima mounds, a geologic formation composed of piles of silt about one meter tall and 5-50 meters across that occasionally have rock rings around the base. We conducted a pilot study to look at the potential relationships between the fire and biological soil crust (BSC) coverage on mounds and intermounds. BSC is a layer composed of small organisms such as algae and mosses that forms on top of soils in our climate. We hypothesized that BSC coverage would be greater on mounds than intermounds, and that crusts would be disproportionately affected by fire across mounds and intermounds. We took photographs of the crust in a 1 by ¼ meter quadrat frame, then analyzed the image through the program 'SketchandCalc' to determine the percent area covered by BSC within the frame. Results showed that burnt intermounds had the greatest BSC coverage, while unburnt intermounds had the least. Data additionally suggest that intermound BSC is more strongly affected by fire, but since many of the unburnt mounds were too covered with other vegetation to accurately measure the BSC coverage, the significance of this is slightly retracted. From this data we were not able to conclusively determine whether BSC coverage is greater on mounds or intermounds but it was found that fire disproportionately affects BSC cover between mounds and intermounds.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Sediment-size distribution and vegetation density on alluvial fans in Umtanum Canyon

Presented by: Thomas Badar, Daniel Brenneman, Jennifer Lewis, Project Mentor(s): Lisa Ely

Abstract: Umtanum Canyon is an east-flowing tributary of the Yakima River Canyon south of Ellensburg, Washington. Alluvial fans have formed along both sides of the canyon at the mouths of small tributaries. We investigated variations in the vegetation density and the sediment size along the alluvial fan gradients. We hypothesized that sediment size would decrease closer to the terminal edge of the fan due to the decreasing energy available to transport larger sediments as distance from the apex increases, while vegetation density would increase due to the presence of finer sediments that allow for greater water retention. We collected data from two alluvial fans on the northern side of the canyon. The alluvial fans were broken into four transects with five 10 m2 plots on each transect and one plot at the apex of each fan. Vegetation density was recorded by dividing each plot into four quadrants and estimating the percentage of sage, shrubs, grasses, and bare ground in each. Sediment samples collected from each plot were sieved into silt, sand, and cobble sizes. The results showed a significant negative correlation between the sediment size and the distance from the top of the alluvial fan transect; however, no significant relationship was found between the percentage of ground covered by plants and the location along the fans. The lack of correlation for vegetation density indicates that sediment size is not the controlling factor, and could be due to the relatively shallow slope of the alluvial fans, allowing for a more even distribution.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Panel: Law & Justice – Supreme Court

Analysis of the Legal Mechanisms Associated with United States v. Texas, et.al 2022

Presented by: Rachael Medalia, Project Mentor(s): Cody Stoddard

Abstract: This presentation will examine the United States Supreme Court's decision in United States v. Texas, et.al, a case which determines the constitutionality of Texas Senate Bill 8. The bill grants the right of citizens to civilly sue anyone who has provided any substantive assistance in providing an abortion to a private citizen, including medical practitioners, taxi drivers, and others. This law is unique in that it does not target pregnant women, but rather all of those around them who assisted in the providing of an abortion. This legal mechanism creates difficulties for constitutional enforcement under current legal methods for bringing a violation of constitutional rights. This presentation will examine the case facts, issue, and reasoning as well as the broader implications for the enforcement of constitutional rights in the United States legal system.

City of Tahlequah, Oklahoma v Bond: Qualified immunity at what cost?

Presented by: Gabriel Diaz, Project Mentor(s): Robert Claridge

Abstract: We live in a time where recordings of misconduct and injustices are at high. We are capable of seeing damages done by police on almost every social media in our society. From the Black Lives Matter movements to the riots that had happened; our world today has seen history repeat itself in numerous of ways. We have stressed the importance of justice being seek for the unjust at the hands of our own criminal justice system. Police brutality has always been here but as we grow into a technological world we are capable of seeing the extent of police brutality; being able to witness it with our own eyes on a screen. Police have violated our amendment rights more times than we all can count. From falsely accusing those of doing harm, abusing their power, using an unnecessary amount of force and the legality of using lethal force if necessary to the prejudices in our own criminal justice system that allows police to use stereotypes to discriminate against a group of people. Which has allowed us to become fearful, untrusting and hatred to the people who are supposed to protect our constitutional right.

The purpose of this project is to access the problems that are surfaced through the qualified immunity doctrine. Going in detail of what qualified immunity is, the advantages police officers have regarding qualified immunity and problems that arise due to qualified immunity will give us a further understanding of what this doctrine entails. Within this project we want to break down the historical context of this doctrine; looking at why this doctrine was created. For an example question, what is the evolution of qualified immunity? We want to see what the qualifications for certain situations that would fall under qualified immunity. For example, a police officer using excessive force to handcuff a person who was resisting arrest. We will go into depth of issues that could arise within the terms of qualified immunity and how we determine a situation would fall under the doctrine of qualified immunity. Continuing the analysis, we will look at all aspects of qualified immunity, look at areas that can be easily affected and determine a better, effective way of determining a certain situation will be under the doctrine of qualified immunity while others will not be.

Garland v. Gonzalez: The Truth About The American Dream

Presented by: Emily Chavez, Project Mentor(s): Robert Claridge

Abstract Increases in immigration in recent years have been fueled by immigrants chasing the "American Dream". The United States continues to see an increase of immigrants every year, in order to solve this issue the United States has imposed deportation centers throughout the border. Esteban Aleman Gonzalez and Gutierrez Sanchez are natives and citizens of Mexico, who have previously illegally crossed to the United States seeking asylum to escape persecution and torture in Mexico. Gonzalez and Sanchez decided again to try to come back to the United States

after being attacked in Mexico and detained by ICE. Currently, they have been detained for over 180 days, with no hope for the future outside these detention centers. The Supreme Court recently listened and is questioning whether a non-citizen who has spent more than six months in an immigration detention center waiting to hear from the deportations are entitled to a hearing before an immigration judge to determine if they will be able to be released on bond?

This project brings attention and awareness of the prolonged detention that contradicts the due process by the 5th Amendment in the United States Constitution. While the plaintiffs are illegal immigrants, The Supreme Court has previously held that one is entitled to a judge when considering civil detentions on the grounds of whether their detention was justified. Many people spend years awaiting trial at detention centers awaiting asylum, in order to seek protection in the United States. In addition, the 1996 Immigration statute claimed that unauthorized immigrants "may" be placed in detention centers for a long period of time (The Illegal Immigration Reform and Immigrant Responsibility Act of 1996). Both the Trump and Biden Administration also agreed that they will be detained for as long as the cases need to be litigated. Given an opportunity to be on the Supreme Court Panel, it is important that The United States needs to find a way to make sure these immigrants are being heard but also have a plan for future occurrences, life detention should not their main focus as it is inhumane but also there is hope with this case that allows for the Supreme Court to listen to the pleas of those seeking asylum.

Protect Me, Protect My Guns

Presented by: Dawson Greenleaf, Project Mentor(s): Teresa Divine
Abstract: When discussing the second amendment of the United States Constitution, it was put into place to protect the right of the people's ability to keep and bear arms. In case New York State Rifle & Pistol Association Inc. v. Bruen Robert Nash and Brandon Koch, both members of the NYSRPA, applied for a general concealed carry permit in the state of New York. New York Penal Law Section 400.00 imposes objective requirements like age and criminal history as well as a submission for proper cause. Both applications by Nash and Koch were denied for lacking proper cause by licensing officer Richard McNally. NYSRPA, Nash and Koch brought a Section 1983 suit against McNally, George Beach and Kevin Bruen alleging that the proper cause requirement violated the second amendment. I will be examining what entails proper cause to allow for a legal possession of a firearm as well hopefully answer the question if New York's denial of the applications for a concealed carry license for self-defense violates the second amendment.

Trust Me, I'm a Doctor: Prescriptions and Professional Legitimacy in Contemporary Medicine. Ruan v. United States.

Presented by: Katherine Denison, Project Mentor(s): Teresa Divine
Abstract: Pursuant to 21 U.S.C. 841 (a)(1), it is unlawful for any person to knowingly or intentionally distribute or possess with the intent to distribute a controlled substance. In Ruan v. United States, petitioner, Xiulu Ruan, was convicted of three counts of conspiring to unlawfully distribute controlled substances, five counts of unlawfully distributing controlled substances, as well as other additional offenses. These convictions followed a jury trial in the United States District Court for the Southern District of Alabama. At trial, the prosecution proved that Ruan and other practitioners within his practice prescribed controlled substances for their own financial gain rather than the benefit of their patients. The District Court instructed the jury that in order for a controlled substance to be lawfully prescribed, it must be prescribed within the usual course of professional practice and prescribed for a legitimate medical purpose. In my presentation, I will be discussing whether a physician should be able to avoid conviction based upon the physician's own subjective belief of whether prescriptions written fall within the usual course of their professional practice.

Law & Justice

An Appetite for Crime: Case Studies of Cannibalism and the Criminology Theories that Explain It

Presented by: Eponine Romo, Project Mentor(s): Sara Toto, Bernadette Jungblut

Abstract: One of the most important aspects of studying crime is identifying how and why certain crimes happen. There are several questions one should ask: Why did this event happen? What caused this to happen? How could it have been stopped? Criminologists use various theories to seek the answer to these questions regarding various types of crimes – from petty crimes, such as stealing a pack of gum from the grocery store, to major, violent crimes, such as cannibalism, the latter of which is analyzed here. The goal is to prevent these crimes from happening in the future by identifying why they are happening now. In this paper, I hypothesize that the same theory, or theories, can explain the crimes of different cannibals. To test this, I use Jeffery Dahmer, Idi Amin, and Issei Sagawa as case studies. Various sources are analyzed, from books to articles to movies, to come up with brief biographies of each man, discussing events from early childhood into adulthood that could have contributed to their crimes. Then, I use this biographical information and analyze three traditional theories: Hirschi's social-bond theory, Agnew's strain theory, and Aker's social learning theory. When examining these three men, it becomes clear that though the number and demographics of their victims differ, these theories explain all three men's actions. Similar life events and personality traits contribute to an increased likelihood of criminogenic behavior, and their motives for murder and cannibalism are rooted in similar places.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Following Braam

Presented by: Taylor Sanford, Project Mentor(s): Christine Henderson

Abstract: Foster care in Washington State is in crisis. There are too many children to place and not enough homes, so children are living in offices, motels, and out of state. News reports all too often mention cases of abuse and runaways in foster homes, and monitoring foster placements is inadequate. This study is significant because it proposes solutions for oversight of foster care children in Washington, solutions which could assist policymakers, DCYF programming, and encourage the public to consider becoming foster parents. This qualitative, case study research seeks to understand how changes on the Braam panel have affected government and policy changes at the Washington State Department of Children, Youth, and Families (DCYF) in monitoring foster care children, placements, and runaways from foster placements throughout the State of Washington. Due to the dissolution of the Braam panel, the research will focus on understanding oversight programming and analysis for foster care children in the State of Washington and will be defined as a case study.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Policy Analysis for Washington State Policy of Undocumented Immigrant Ineligibility for Medi-Care

Presented by: Alan Clay, Project Mentor(s): Christine Henderson

Abstract: On February 29th, 2020, Washington state, ground zero for the COVID-19 pandemic in America, would gain another national distinction as the first state in America to record a death from COVID-19. Over the next two years, a wave of mass deaths would sweep the nation as almost 1 million people perished from severe cases of the disease. These deaths would be concentrated primarily in the most vulnerable communities, with the most tenuous connections to essential resources like healthcare. Undocumented immigrants and migrant workers in America sought out healthcare at a far lower rate than any other group in America during the height of the pandemic due to fear of them or a family member being deported, prohibitive costs of care, and language barriers. Race, class, and immigration status would compound upon one another to render healthcare too expensive, too difficult, and too dangerous for undocumented immigrants to seek medical care during the worst phases of the COVID-19 pandemic.

The passage of legislation and then defending said legislation against judicial review is one of the best ways to provide a stable basis from which immigrants can seek out essential services without fear of deportation or confinement. The policy analysis will highlight the legal roadblocks faced by asylum seekers, climate refugees, migrant workers, and legal residents as a result of being denied state-funded healthcare insurance. The purpose of this policy analysis is to qualitatively and quantitatively show the damage wrought over the last 30 years in America, by the current policy of excluding immigrants from Medi-Care eligibility and to present the case for the passage Washington State proposed House Bill 1191, a landmark bill for a state expansion of Medi-Care to include undocumented immigrants in Washington.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Women, Prison and Cognition in Washington State

Presented by: America Sanchez, Project Mentor(s): Christine Henderson

Abstract: In Washington State, there is a need to develop gender-responsive reentry and rehabilitation correctional programs due to differences in reentry and healing programs for men and women. For example, women have more factors hindering social support. Washington State incarcerates, on average, 796-800 women per day in its two women's state prisons - Washington State Correction Center for Women (WSCCW) and Mission Creek Corrections Center for Women (MCCCW). There is an incomplete restorative improvement program for women in WSCCW and MCCCW. Moreover, the two Washington women's prison rehabilitative models of personal responsibility are stifled by gaps in programming and research. The research focuses on the effects of personal responsibility programs, such as prison writing programs, on past and future crime paths, beliefs, and behavior. Women incarcerated in Washington State may benefit from psychological activities or practices that emphasize understanding through thought and experience early in life or before incarceration. Therefore, the researchers conducted a qualitative exploratory approach using a constructivist paradigm by conducting qualitative interviews. The investigators explored pre and post reasoning to crime pathways and experiences, beliefs, thoughts, and ideas related to cognitive-based programming at WSCCW and MCCCW. When considering the research findings, this study proposes using and developing the gender-based holistic cognitive model for incarcerated women and post-incarceration.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Molecular and Cell Biology Specialization; Biological Sciences

Prevalence of Rickettsia in ticks collected near I-90 in Upper Kittitas County

Presented by: Daniela Mendez, Project Mentor(s): Gabrielle Stryker

Abstract: Ticks transmit more pathogens than any other group of blood-feeding arthropods, causing disease in humans as well as domestic and wild animals. Rickettsia is a genus of bacteria that is transmitted by arthropod vectors, including ticks. Dermacentor ticks become infected with Rickettsia by feeding on infected mammals and/or through vertical transmission from parent to offspring. Rickettsia is transmitted to humans through tick bite, suggesting that rickettsia is localized in the salivary glands of the tick. Spotted fever group (SFG) Rickettsia cause human disease and is seen predominantly in the southeastern United States during mid-spring through late summer. Spotted fever rickettsioses also occurs in Washington but little research has been done on the prevalence of pathogenic and non-pathogenic Rickettsias in eastern Washington. In this study, we collected ticks from small mammals trapped along the I-90 corridor. DNA was extracted from twenty ticks and analyzed by polymerase chain reaction (PCR) to detect bacterial DNA. Forward and reverse primers of Rr190.70 were used to identify the presence of Rickettsia DNA. Of the 20 ticks tested, 16 (80%) were positive for Rickettsia. Screening ticks for disease-causing pathogens provides useful epidemiological information on their distribution and the prevalence of pathogens that pose veterinary and medical health risks.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Non-Profit Management; Interdisciplinary Studies- Social Sciences

Barriers to Prolonged Student Led Civic Engagement: Utilizing a PESTLE analysis to Create Sustainable College Student Experiences and Activist Praxis that Withstand Annual Student Transitions & Attrition

Presented by: Dylan Gilbert, Niranjan Malla, Ava Pruitt, Jackson Sorensen, Audrey Tribble
Project Mentor(s): Deanna Marshall

Abstract: Participation in college student clubs and organizations has been linked to the development of student leadership skills and a life-long commitment to community engagement. While the impact of participation can be meaningful, student experiences like continued engagement in clubs and organizations can be hard to sustain due to a constant revolving door of students as they graduate and move on to new experiences. In order to sustain the impact that clubs and organizations have on college student engagement, students must determine how to sustain the experience itself and avoid the potential collapse that accompanies student attrition.

Central Washington University's Students With A Purpose (CWU SWAP) stumbled upon this barrier of sustainability in its third year of existence. Even though the students had found success early on while getting the club off the ground; they learned the hard way that success does not just repeat itself, but is something that needs to be cultivated and reassessed to create a sustainable organization. The 21/22 elected student leadership team conducted a PESTLE analysis to understand their organization's position, potential, and direction in relation to macro-environmental factors that impact sustainability. This analysis was further used to create a strategic plan that assisted the students in building a foundation that would provide a sustainable organization that will withstand the challenge of attrition and continue on after their time at the institution has ended and can be further applied to other clubs and organizations seeking to do the same.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: Funding from Central OUR Grants

Physics

A quantitative assessment of uncertainty in the measurement of violin impact response

Presented by: Seth Lowery, Project Mentor(s): Andy Piacsek

Abstract: It is a commonly stated belief among violin players and luthiers that new violins require a period of "playing in" for the tone to develop. Several studies have worked towards an answer to this question, such as measuring the change in tone according to the human ear or the vibrational response of stimulated wood. As the effects of sustained excitation on the mechanical response of violins will likely be subtle, it is necessary to create a consistent method of measurement and to quantify the expected range of deviation among repeated measurements. We measure admittance (velocity/force) by tapping the bridge with a small modal impact hammer and recording the velocity response of the top plate near the opposite side of the bridge using a laser doppler vibrometer. The acoustic response is also measured in an anechoic chamber. Since measurements of the same violin on different days do not produce identical response curves, several methods of characterizing the deviation were developed and compared. These uncertainty metrics will be used in the second phase of the experiment to determine the significance of the results, and ultimately work towards a better understanding of the effects of breaking in violins.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Accessible Computational Modelling of Electronic Band Structures

Presented by: Ben Hansen, Project Mentor(s): Benjamin White

Abstract: Quantum systems are largely characterized by the energies of their states. The set of electron energies in solid materials is called band structure. Most electronic properties of a particular material can be understood by studying its band structure. This makes calculating band structures of significant interest to physicists and materials scientists. Many tools exist for calculating band structures, ranging from pen and paper to more contemporary methods including top-tier toolkits designed to run on supercomputers. However, intermediate tools that can be used by undergraduate students to numerically compute band structures are not readily available. This project aims to fill this gap in intermediate tooling by developing a program to calculate band structures at a level higher than is feasible with pen and paper, but that will run on a standard desktop PC. The program was constructed using Python and includes a user-friendly graphical interface. It allows the user to input the details of a crystal structure and select one or more approximation schemes with which to calculate band structures. When run, the program produces a plot with the calculated band structure(s) alongside a density of states plot. The ability to easily calculate and compare band structures will illustrate core ideas in band theory such as band splitting without requiring tedious calculation by hand. The program enables students to relate how different parameters change the resulting band structure and will serve as the basis for new curriculum used in classroom settings such as CWU's Solid State Physics (PHYS 441).

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Consequences of Reducing Symmetry in Quantum Systems

Presented by: Nicholas Klein, Project Mentor(s): Benjamin White

Abstract: Symmetry is a fundamental characteristic of any physical system and it plays a clear role in biology, chemistry, classical physics, mathematics, and other disciplines. The role of symmetry in quantum mechanics is more abstract, and this research project constituted an investigation of how the symmetry of a quantum system governs the possible energies of the system's states. A triangular arrangement of three spin-1/2 particles was used as a test system. The eigenenergies and eigenstates of a triangular arrangement with high-symmetry (equal exchange interactions between the particles) were calculated and compared to the eigenenergies and eigenstates of a triangular arrangement with low-symmetry (one of the exchange interactions was different than the other two). The eigenstates of the Hamiltonian of each arrangement were calculated and expressed in terms of the eigenstates of the spin-squared and z-component of spin operators, and the eigenenergies were calculated by applying the Hamiltonian of each arrangement to those eigenstates. The high-symmetry arrangement had a significant number of different states with the same energy (significant degeneracy), while the low-symmetry arrangement had less degeneracy. Both the high-symmetry and low-symmetry arrangements contained time-invariance symmetry, which can be broken by applying a magnetic field. The consequences for the eigenenergies of the two arrangements when a magnetic field is applied were calculated and a reduction in degeneracy was observed for both arrangements. The results of these calculations show that, in general, reduction of symmetry in quantum systems leads to degeneracy in energy levels being lifted.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Determining Versatile Wavefunctions to Use in Variational Principle Calculations

Presented by: Zachary Goe, Project Mentor(s): Benjamin White

Abstract: The energy states of a quantum mechanical system are one of the most important factors governing its physical characteristics and properties such as heat capacity, magnetization, and many others. At low temperature, there is a high probability the system will be in its "ground state" (the state with lowest energy). When working with quantum mechanical systems, it is generally impossible and/or impractical to calculate exact ground state energies. Rather, mathematical techniques, namely the variational principle, in which the expectation value of energy is calculated, are used to estimate the ground state energy. For a given Hamiltonian, representing the quantum mechanical system's total energy, the expectation value is calculated using a normalized test wavefunction containing the expected characteristics of the system's ground-state wavefunction. In this research project, three different test wavefunctions (Gaussian, Lorentzian, and Hyperbolic Secant functions) were used to estimate ground state energies for different quantum systems. Expectation values obtained using the variational principle provide an upper bound on ground state energy, so the wavefunction providing the lowest energy estimate is closest to the true ground state wavefunction. The goal of this project was to determine whether a particular test wavefunction worked well for a variety of quantum systems. The Gaussian test wavefunction generally gave the best results in terms of providing the lowest ground state energy of all test wavefunctions. This project concluded that the Gaussian test wavefunction offered reliable estimates for ground state energies for a variety of quantum systems.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Electron Scattering Measurements of La1-xSrxMnO3

Presented by: Nyal McCrea, Project Mentor(s): Benjamin White

Abstract: Materials are complex systems, built from a lattice of ions and containing electrons. There are many different types of interactions between electrons or between electrons and the lattice that stem from their electrical charges, spins, and orbital angular momenta. For specific experimental conditions (temperatures, pressures, etc.), one particular interaction can dominate, causing the material to undergo a phase transition into an ordered state promoted by that interaction. Measurements of electrical resistance as a function of temperature (ERFT) on materials can detect phase transitions and offer insight into the underlying interaction(s) responsible for producing the ordered state. When a phase transition occurs, a rapid change in resistance results since there is more scattering in disordered states and less scattering in ordered states. To measure ERFT, a current of electrons is directed through a sample; measured electrical resistance values depend on electron scattering in the material. Electrons can scatter from: (1) impurities and defects, (2) other conduction electrons, (3) the lattice, and (4) magnetic moments. The system La1-xSrxMnO3 is interesting because the phase transition temperatures associated with the ordered ferromagnetic state depend sensitively on the lanthanum to strontium ratio. To investigate these phase transitions, ERFT measurements were made between 4.2 - 300 kelvin on polycrystalline samples of La1-xSrxMnO3 from $0.1 \leq x \leq 0.3$. Measurements were performed using a standard four-wire technique and a closed-cycle refrigerator to cool the samples. The results of these experiments demonstrate how sensitively ERFT measurements probe changes in electron scattering during a ferromagnetic phase transition.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Investigation of a noninvasive method for monitoring intracranial pressure using sheep skulls

Presented by: Nick Cameron, Project Mentor(s): Andy Piacsek

Abstract: It has been previously demonstrated that resonance frequencies of fluid-filled shells of simple geometry are shifted in proportion to fluid pressure [J. Acoust. Soc. Am. 131, EL506 (2012)]. We investigate the applicability of this approach for measuring changes of intracranial pressure in ovine skulls. A catheter inserted through the foramen magnum of a complete sheep's head enables the control of hydrostatic pressure, which is measured independently using a pressure transducer inserted into the parenchyma through a drilled hole in the skull. The vibrational response is measured using a small modal impact hammer to gently tap the skull with small accelerometers mounted at different locations on skull. Acceleration normalized by impact force is computed in the frequency domain, averaged over multiple taps. Significant peaks in the response spectrum are identified and associated with vibrational modes observed using a laser doppler vibrometer. The consistency with which peaks shift in frequency in proportion to ICP is reported. The effect of tap location and accelerometer placement is also explored.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Molecular Motor Movement in a 3D Cytoskeleton Network

Presented by: Dominic Horne, Project Mentor(s): Erin Craig

Abstract: The cytoskeleton of a cell is composed of microtubules, actin filaments, and intermediate filaments. Cargo, such as organelles and protein complexes, is transported around the cytoskeleton by molecular motors such as kinesin and dynein. The filament network can vary wildly from cell to cell, so modeling molecular motor movement can be challenging. The goal of this project is to use computational simulations to model the movement of multiple molecular motors within a cytoskeletal network. In order to simulate the movement of molecular motors, a model for the internal structure of the cell was first needed. To account for the variations between cells, a cubic array is established with multiple actin and microtubule filaments randomly placed within each layer of the array. A modified 3-dimensional random walk program is used to simulate the biased Brownian movement of molecular motor complexes through a cell. The bias of the Brownian motion is applied based on the molecular motor's current position within the cytoskeletal network. Initial simulations show that molecular motor complexes will move along the filaments for the most part, but will eventually detach and undergo pure Brownian motion until they latch onto another filament.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Observing Transiting Exoplanets with the Central Washington University 0.6-meter Research Telescope

Presented by: Natalie Velez, Project Mentor(s): Cassandra Fallscheer

Abstract: Using the 0.6-meter research telescope at Central Washington University (CWU), six confirmed transiting exoplanets were observed to test whether exoplanet transits are detectable with the CWU telescope. Observations were held between 16 June and 22 July 2021. The targets of observation were the exoplanets orbiting CoRoT-2 (1.74 day orbital period, 0.0868 day transit duration), HAT-P-18 (5.5 day orbital period, 2.7 hour transit duration), HAT-P-23 (1.2 day orbital period, 2.2 hour day transit duration), HAT-P-67 (4.81 day orbital period, 6.9 hour transit duration), Kepler-15 (4.9 day orbital period, 3.6 hour transit duration), and Kepler-20 (3.7 day orbital period, 2.2 hour transit duration). A clear indication of a transit was not detected in the data.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

This work is supported by: McNair Program

Wildcat Rocketry's Completion of the 2022 NASA Student Launch Competition

Presented by: Henry Reinhardt, Jessica Zarkos, Dominic Horne, Makaila Puhrmann, Al Veitas, Project Mentor(s): Darci Snowden

Abstract: Wildcat Rocketry is the team of 9 Central Washington University (CWU) students that competed in the 2022 NASA Student Launch (NASA SL) competition. The NASA SL is a yearly competition, spanning 9 months with new mission criteria every year. This year, the mission criteria was to simulate an Earth-to-foreign-body transfer, where a rocket would launch and land in on an unexplored celestial body, and upon landing, be able to autonomously detect its location and report that figure back to mission control. GPS and magnetometers were not allowed for this competition, since they would only work with detailed information about the target body. Wildcat Rocketry settled on a method we dubbed "A Visual Analysis Tracking of A Rocket" (AVATAR), which would take pictures and, based off of a scaling factor and known position of a target object, provide the landing location of the airframe. The Wildcat Rocketry team has built a 105 inch tall rocket, powered by a K1050W-PS motor allowing it to fly to a height of greater than 4,000 ft. before safely returning to the ground to be recovered and used again. This competition has challenged the students of Wildcat Rocketry in the engineering process, community engagement, and teamwork, making us better academics and communicators, and teaching us critical skills in project management and problem solving in the process.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: William O. Douglas Honors College (DHC)

Primate Behavior & Ecology

Chimpanzee Enrichment Activity within a Sanctuary Environment

Presented by: Jay Holloway, Project Mentor(s): Kara Gabriel

Abstract: In the last decade, captive chimpanzees have been designated as an endangered species as well as being retired from biomedical research in the United States. Most enrichment research is conducted in zoo settings which differ from sanctuary settings in multiple ways. Therefore, the current study examined how chimpanzees interacted with a variety of enrichment objects in a sanctuary environment.

This study coded behaviors in 615 randomly sampled archival videos of enrichment interactions of 10 chimpanzees at Chimpanzee Sanctuary Northwest in Cle Elum, Washington. Enrichment use was analyzed for behavior (i.e., carry, examine, oral, play on, vocalize, active tactile, wear, nest, rest, and out of view), social context (i.e., solitary, affiliative, proximate, aggressive, and submissive), and type of object (i.e., foraging, toys, structural, nesting, technology, art, and other).

Results indicates that, of the various types of enrichment devices present, chimpanzees interacted the most with foraging objects (34.9%, M = 12.8 ± 34.4 sec) and toys (30.0%, M = 14.2 ± 28.6 sec), followed by structural (21.0%) and nesting objects (11.4%). Furthermore, chimpanzees frequently engaged in oral (43.3%, M = 2.3 ± 3.6 per occurrence) and active tactile (31.1%, M = 1.7 ± 2.9 per occurrence) manipulation behaviors while interacting with objects. Solitary settings were associated with more foraging behaviors, while social settings promoted play-like behavior with toys. These findings suggest that chimpanzees will interact with a variety of objects of interest, especially if available enrichment devices offer foraging or play-like opportunities that foster expression of species-typical behaviors.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Factor Influencing Intestinal Parasites in Black-and-white Ruffed Lemurs.

Presented by: Eliette Noromalala, Project Mentor(s): April Binder, Kara Gabriel

Abstract: Ecological factors such as feeding, and climate might influence intestinal parasite infection fluctuation in non-human primates. Here, we examined if high fruit consumption and climate (i.e., temperature and rainfall) lead to monthly variation in parasite infection in a frugivorous species of lemur, the black-and-white ruffed lemurs. To do this, we collected feeding data every 5 minutes, temperature, rainfall daily, and fecal samples from the black-and-white lemurs at the Mangevo site, Ranomafana National Park, Madagascar from February through May 2019. We used fecal floatation and sedimentation microscopic examination techniques to identify and count parasite species contained in our samples. Two nematodes and three protozoa species of parasites were recovered with Nematodes and Balantidium were the most frequently found in the observed individuals. The month of March differs from May in terms of fruit consumption, the number of species of parasites, nematode parasite worm and egg counts, minimum and maximum temperatures, and rainfall. Low nematode parasites worm and egg production are associated with high fruit consumption and high temperature. There was a trend for lower minimum temperatures to be associated with increases in the number of parasite species recovered. Temperature and fruit consumption played an important role in parasite infection, particularly nematode worm counts. Currently, we are extending our observation to a full-year period using the molecular method.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Psychology

A Resource Guide Towards Improving Mental Health Through Art

Presented by: Madison Moon, Project Mentor(s): Allyson Rogan-Klyve, Cristina Bistricean

Abstract: The goal of this project is to explore art as a way to help people learn ways of coping with anxiety or overall stress. The project is a readily available website that includes methods to aid individuals with their mental health struggles. Multiple research studies present the positive impact that art can have on mental health. This project showcases some of my artwork and provides a step-by-step instruction on how to create it. I have incorporated multiple different forms of artwork such as mindfulness-based coloring, traditional art, and animation. Mindfulness-based coloring is meant to clear the mind while coloring, traditional drawing typically involves paper and pencil to draw, digital drawing includes drawing in some form of digital device to draw on, and animation consists of drawing multiple scenes or images by putting them together to create moving and fluid art. Each individual is unique, different, and contain various preferences for certain activities. For this reason, there are multiple forms of art that people can choose from. Additionally, this project contains a portfolio section that can give others inspiration for their own projects and creations with the step-by-step guides. The portfolio involves captions of each artwork that was created and may be presented as examples as to how people can actively express their feelings and emotions with art in a mindful way. Whether a person needs a moment to de-stress with an art activity or a productive hobby, this project would serve as a resource to cope and support their needs.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Combatting COVID-19 Misinformation on Social Media: Do False Information Tags Work?

Presented by: Jeremy Simmons, Project Mentor(s): Danielle Polage
Abstract: The spread of false information on social media has become a growing concern for authorities around the world. Many social media companies have now begun to tag posts with false information warnings in order to prevent the spread of potentially dangerous misinformation. While previous research has shown that this method is effective at reducing belief in the moment, newer research is suggesting that the benefits of false information tags are negated by repeated exposure. This is called the "illusory truth effect". The primary goal of this study is to investigate how this phenomenon applies to misinformation concerning the COVID-19 pandemic and whether belief in this misinformation is correlated with levels of fear of COVID-19 and compliance with prevention guidelines. In order to investigate these questions, participants will be asked to view and rate the accuracy of numerous statements concerning the pandemic as well as respond to various questionnaires in order to determine their level of fear and compliance. One week after the first session, participants will return and rate the same statements (among new ones as well) for accuracy. I expect that belief in these statements will increase following the second exposure regardless of whether the misinformation was tagged. If the data I obtain supports this hypothesis, it will add to the growing body of research that suggests simply warning people about misinformation does not prevent belief in that information over longer periods of time.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Creative and Innovative Leadership Styles During the Covid 19 Pandemic

Presented by: Sanjeet Singh, Project Mentor(s): Erica Holley, Pamela Nevar
Abstract: Creative and innovative leadership, or CIL, is a style of leadership where leaders engage in specific behaviors that foster employee creativity and innovation (Khalili, 2017). As the world has shifted toward a more remote workforce due to the Covid-19 pandemic (Sigahi, et al, 2021), this paper argues that CIL has the potential to positively impact other critically important workplace outcomes. Specifically, this paper explores the direct effect of CIL on the following three employee behaviors; affective well-being, voice, and cyberloafing. This research also examines two moderators; employee gender and the percentage of time spent working remotely. Across a large online survey (N=320) of employees from a variety of occupations, organizations, and industries, we find partial support for our theoretical model (see Figure 1).
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Disproportionate Learning Disparities Among Student of Color During the COVID-19 Pandemic

Presented by: Arturo Contreras, Eunice Magana, Chase Claymore, Natalie Amos, Lea Lebaron, Project Mentor(s): Heath Marrs

Abstract: This presentation will address initial research on the disproportionate impact of the COVID-19 pandemic on students of color in K-12 education. An important question as COVID-19 has occurred is how it has impacted various diverse communities in many areas, such as health, employment, and education. There is much variability in the United States in the resources available to various communities to support education, and as the pandemic hit it is possible that communities and school districts with different resources impacted the learning experiences of students. Reports of communities of color facing higher exposure and death to the COVID-19 pandemic suggests that communities that faced health disparities prior to the COVID-19 pandemic will also face disproportioned health disparities (Hopper et al., 2020). It is also possible that students of color who faced structural inequalities prior to the pandemic will face higher rates of school disengagement due to the disparities amplified by the pandemic (Jones et al., 2021). For example, Haderlein and colleagues (2021) explain that there is a difference in access to technology, instruction, instructional supports, services, and preferences for in-person learning among various groups (race/ethnicity, income, urbanicity, partisanship, and grade level). This presentation will provide an overview of what we have learned of the effects of the pandemic and how it has impacted the school experiences and learning for low-income students of color in K-12 education.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Improving student outcomes through growth mindset micro-messaging and appreciative advising

Presented by: Giselle Jaimes, Han Vo, Project Mentor(s): Tonya Buchanan

Abstract: Research suggests that advising communications can have powerful effects on important students outcomes (e.g., Kyte et al., 2020), especially for students of color (e.g., Yeager et al., 2016). Across two experimental studies and Universities, we explored the effect of advisor micro-messages on positive student outcomes (e.g., persistence, support). In Study 1, CWU undergraduates (N = 164) imagined receiving an advisor email reply regarding a challenging class that, based on random assignment, contained micro-messages related to growth mindset, appreciative advising, or an information-only control, and completed measures of student outcomes. The effect of messaging was significant, $F(2, 106) = 3.70$, $p = .03$, with micro-messages (i.e., growth mindset and appreciative advising) leading to more positive student outcomes compared to information-only communications overall, $t(159) = 2.53$, $p = .03$ and for perceived support, $t(160) = 2.99$, $p < .01$, and persistence, $t(160) = 2.63$, $p < .01$, individually. Multiple regression analyses controlling for demographic information indicated a significant interaction between student identity and messaging condition ($\beta = .68$, $p=.06$), with the positive effects of micro-messaging most pronounced for students of color and first-generation students. Study 2 replicated the methodology of Study 1 with a sample of UT Arlington students (N=155) and found a similar pattern of results. Whether academic advisors encourage a growth mindset or take on appreciative advising perspectives, our research suggests that relevant micro-messages have positive effects on student outcomes, especially for students from historically underserved groups. This research highlights opportunities to shape consequential student outcomes and possibly reduce achievement gaps through small, strategic changes in language.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Neutral Face Expression Recognition and Big-5 Personality Trait Attributes

Presented by: Miranda Roseman, Amber Anderson, Project Mentor(s): Mary Radeke, Anthony Stahelski
Abstract: Prior research on facial expression recognition reveals that when individuals are exposed to neutral facial expressions, they label the perceived emotional state of the model's face then create overgeneralized inferences of the model's character that matches their emotional perception (Hester, 2019; Todorov et al., 2014; Todorov et al., 2013). Hester (2019) reported that female models who exhibited neutral facial expressions were misidentified as more angry, more threatening, and less attractive than male models exhibiting the same neutral facial expressions. Hester referred to this as the Perceived Resting Negative Emotion Phenomenon (Hester, 2019). Our study compared personality perceptions made by participants when they correctly versus incorrectly identified the emotion of a neutral facial expression. Three-hundred seventy-one participants (37.7% male; 62% female) completed the study survey via MTurk. Participants labeled each neutral face model with one emotion: either anger, disgust, fear, happy, sad, surprised (incorrect emotion labels), or neutral (correct emotion label). Using the Big Five Personality measure, participants then evaluated the model on the traits of extraversion, conscientiousness, agreeableness, neuroticism, and openness. Similar to Hester's (2019) findings, participants in this study demonstrated significant differences in perceptions made about the agreeable and emotionally stable nature of a female model when emotion was incorrectly identified as anger or disgust. In contrast, male models were incorrectly identified as sad more than any other incorrect label, and perceptions of conscientiousness and emotional stability (neuroticism) were significantly different in comparison to correctly identified neutral expressions. Implications of this study and future directions are discussed.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

The COVID Slide: Learning Loss during the COVID-19 Pandemic

Presented by: Chase Claymore, Lea Lebaron, Natalie Amos, Eunice Magana, Arturo Contreras, Project Mentor(s): Heath Marrs
Abstract: This presentation will address the impact of the COVID-19 pandemic on K-12 students in the United States. Previous research has found that during extended times away from school – such as summer vacations – many K-12 students lose proficiency in important academic skills such as language, reading, writing, and math. The process of learning loss over the summer has been termed the "Summer Slide." With the extended school closures and difficulties with accessing online instruction during the COVID-19 pandemic, many researchers are concerned with a new "COVID Slide" (Kuhfeld et al., 2020). There were numerous disparities in learning models across states, communities, and school districts, which may have an impact on learning outcomes. In addition, initial research suggests that there has been a disproportional impact on BIPOC and low-income students in regards to learning loss when compared to wealthier white counterparts, with months of learning loss across all demographics (Dorn et al., 2021). Research has also indicated that in-person education varied from state-to-state, and that disparities in access to in-person, or even high-quality virtual learning has led to learning loss and worsening mental health in students (Oster et al., 2021). Washington state has experienced a dramatic increase in high school students that have earned failing or no-credit grades. Coupled with falling enrollment rates in postsecondary institutions, these implications could have long-term effects on student livelihood and satisfaction, as well as reveal that students may be feeling less prepared in continuing their education or have not met high school graduation requirements (Kwakye & Kibort-Crocker, 2021). The COVID-19 pandemic, and the consequent "COVID Slide", broadly had negative outcomes for student learning and exacerbated existing inequities in the form of student achievement and opportunity.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

The Potential Impact of Race/Ethnicity and Skin Tone on Voter Judgements of Candidates of Color

Presented by: Isaiah Andersen, Project Mentor(s): Tonya Buchanan, Patrizia Chirco

Abstract: The potential impact of race/ethnicity and skin tone on voter judgments of candidates of color Previous work from our lab suggested that political candidates' intersections of skin tone, and race/ethnicity differently affect voting preferences and interpersonal judgments made by White and non-White participants. In the current study we focused on the influence of candidate race/ethnicity on voters' preferences for a candidate of color, and the accuracy and impact of memory for candidate skin tone. Participants (N=190) viewed the same political candidate with brown skin tone, self-identified as either Mexican American or African American (randomly assigned) and then were asked about their attitudes and voting intentions regarding the candidate. Supporting hypotheses and prior work, White voters held more negative attitudes and reported being less likely to vote for racially underrepresented candidates (vs non-White voters). Further, participants remembered the candidates as having a lighter skin tone than they did, and the extent of this bias predicted judgments of warmth, trustworthiness, and expertise of the candidate. When presented with the same candidate with the same skin tone, White participants were more likely to vote for the candidate said to be African American (vs Mexican American). These results combined with our previous research, suggest that potential colorism effects led voters to make judgments based not only on the lightness or darkness of a political candidate's skin tone, but on the intersection between their skin tone and their race/ethnicity (i.e., preferring candidates whose skin tone was lighter relative to their ethnic group). Theoretical, practical, and political implications for candidate judgments influenced by skin tone and race/ethnicity are discussed.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Utilizing MTSS for English Learners

Presented by: Juan Serrano, Maritsa Rodriguez, Nick Garcia, Project Mentor(s): Heath Marrs

Abstract: This presentation will review current research and best practices in utilizing Multi-Tiered Systems of Support (MTSS) for English Learners (ELs). MTSS is a system for providing screening and early intervention for K-12 in academics and behavior as early as possible (Kuhn & Albers, 2021). Historically, the most prominent model is the wait-to-fail model in which support is only offered after a student falls so far behind it is difficult to make typical progress. As MTSS is implemented, an important question is how to provide culturally responsive practices that meet the needs of English learners (Linan-Thompson et al, 2022). In this presentation, current research on the reliability and validity of academic screening tools for use with English learners will be reviewed. Current practices on how English language and heritage language proficiency is assessed in Washington schools will be presented. In addition, recommendations for best practices for school MTSS teams will also be presented. The importance of multi-disciplinary collaboration will be emphasized. To provide the best services, professionals such as general education teachers, English as a Second Language teachers, speech-language pathologists, special education teachers, school psychologists, and administrators should work together to share ideas and resources for effective assessment and intervention (Goodrich et al, 2022). Overall, this presentation will show the benefits of implementing MTSS and its applicability not only with ELs, but also with all students within school systems facing academic difficulties.

Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

What About Me? Understanding the Relationship Between Gender Identity and Social Anxiety

Presented by: Jessica Allen, Project Mentor(s): Susan Lonborg, Tonya Buchanan, Kara Gabriel
Abstract: Anxiety impacts a substantial portion of the United States population. Those suffering from anxiety disorders, though, might very well be minority groups who have been left out of anxiety and trauma research all together. Leaving minority groups out of the conversation of mental health assumes mental illness affects every population and every individual to the same extent, which can prevent those in need from getting proper, targeted treatment. Through analysis of transgender and gender-diverse individuals' accounts of their experiences with social anxiety, this study began to develop a scale specifically aligned with these experiences and whether it is unique to these demographic groups compared with already established social anxiety scales in the field of psychology. Further, this study has examined whether body dysmorphia symptoms have any correlation with social anxiety symptoms in either gender-diverse or cisgender populations.
Presentation Type: SOURCE Poster Session (Viewable May 16- May 20).

Working Memory Differences Between Dancers and Non-Dancers

Presented by: Mason Low, Shaun Howard, Project Mentor(s): Ralf Greenwald
Abstract: Dance has long been regarded as being a therapeutic practice, particularly for physical and emotional states. Although the benefits of dance have primarily been focused on physical and emotional well-being, it has since been extended into the cognitive realm with emerging research examining the effects of dance when it comes to memory. Many studies have shown the preventative benefits of dance against diseases such as Alzheimer's and dementia in older adults. However, research on the relationship between memory and dance has been isolated to the older adult population. To gain a better understanding of dance and memory, this study examined the relationship between dance and working memory in young adults. This study will utilize behavioral subtests of the Test of Memory and Learning, 2nd edition (TOMAL 2) measuring visual and auditory working memory. Following the evidence from previous research on the older adult population, we hypothesize that there will be working memory differences between dancers and non-dancers, more specifically, we hypothesize that dancers will score significantly higher on the TOMAL-2 than non-dancers.
Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

Psychology; Public Health; Sociology

A Qualitative Inquiry into Generation Z College Student's Social Emotional Wellbeing and Academic success throughout the COVID-19 Pandemic

Presented by: Bianca Sanchez, Project Mentor(s): Olivia Holter

Abstract: The COVID-19 pandemic has drastically impacted individuals' lives in a variety of ways. Early in the pandemic, federal and state mandates required individuals to stay home and distance unless they met specific criteria. For college students, the pandemic meant the closure of campuses and the shift to online learning. This similarly impacted students with most shifting their socialization to technology to stay connected. Even prior to the pandemic, research suggested that there is a negative correlational relationship between social-emotional wellbeing and academic success. Throughout the pandemic, researchers have shown that there has been a general rise in the rate of mental health disorders globally. However, there is a general dearth of research examining college students' personal experiences as it relates to their social-emotional wellbeing during the pandemic and how this may have impacted their academic success. For this reason, this qualitative study examined generation Z college students' perspectives on the impact of the COVID-19 pandemic on their social-emotional wellbeing and academic success. In this study, 11 undergraduate students aged 18-23 were given a semi-structured interview with questions focusing on their social well-being, emotional well-being, and their academic success. Results suggest that students experienced reported experiencing symptoms of anxiety, depression, and a general lack of motivation when it came to academics. The findings also suggest that students coped with the pandemic by utilizing exercise, mindfulness activity, or participation in a hobby. Attendees of this presentation can expect to learn about the methodology and results of this study as well as about the potential implications for university personnel.

Presentation Type: SOURCE Oral Presentation (10mins, in-person/via zoom on May 18 & 19)

This work is supported by: McNair Program.